GenCore version 5.1.3

OM nucleic - nucleic search, using sw model

Run on: February 16, 2003, 15:49:44 ; Search time 215.94 Seconds
(without alignments)
14704.597 Million cell updates/sec

Title: US-09-497-967-44
Perfect score: 1410
Sequence: 1 atgaaaaataatattttagt.....cttattatttattatgatga 1410

Scoring table: IDENTITY_NUC
Gapop 10.0 , Gapext 1.0

Searched: 2185239 seqs, 1125999159 residues

Total number of hits satisfying chosen parameters: 4370478

Minimum DB seq length: 0
Maximum DB seq length: 2000000000

Post-processing: Minimum Match 0%
Maximum Match 100%
Listing first 45 summaries

Database : N_Geneseq_101002:*
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23: /SIDS2/gcgdata/geneseq/geneseqn-embl/NA2001B.DAT:*
24: /SIDS2/gcgdata/geneseq/geneseqn-embl/NA2002.DAT:*

Pred. No. is the number of results predicted by chance to have a score greater than or equal to the score of the result being printed, and is derived by analysis of the total score distribution.

SUMMARIES

Result No.	Score	% Query Match	Length	DB	ID	Description
1	1410	100.0	1410	21	AAA97060	55kD i-antigen cod
2	1404	99.6	1404	21	AAA97038	55kD i-antigen nuc
3	1402.4	99.5	1404	21	AAA52136	55 kDa i-antigen g
4	784.4	55.6	1410	21	AAA97089	Synthetic I. Multi
5	782.6	55.5	1404	21	AAA97040	55kD i-antigen syn
6	781	55.4	1404	21	AAA97065	Synthetic 55kD i-a
7	258	18.3	2486	21	AAA97037	Nucleotide sequenc
8	254.8	18.1	2811	21	AAA52134	pBICH3 construct c
9	252.6	17.9	1326	21	AAA97036	48kD i-antigen nuc
10	251	17.8	1326	21	AAA52135	48 kDa i-antigen g
11	73	5.2	138	21	AAA97075	G5 synthetic gene
c 12	68.2	4.8	123	21	AAA97076	G5 synthetic gene
c 13	66.2	4.7	104	21	AAA97072	G5 synthetic gene
14	62.8	4.5	100	21	AAA97073	G5 synthetic gene
c 15	62.8	4.5	100	21	AAA97080	G5 synthetic gene
16	60	4.3	60	21	AAA97041	Ichthyophthirius m
17	60	4.3	60	21	AAA97042	Ichthyophthirius m
c 18	60	4.3	1635	22	ABA49946	Human breast cell
c 19	60	4.3	1635	22	ABA67865	Human foetal liver
c 20	60	4.3	1635	22	ABA34921	Probe #13387 for g
c 21	60	4.3	1635	22	AAK16270	Human brain expres
c 22	60	4.3	1635	22	AAK42016	Human bone marrow
c 23	60	4.3	1635	22	AAI22780	Probe #12713 for g
c 24	60	4.3	1635	22	AAI48082	Probe #16768 used
c 25	60	4.3	1635	22	AAI08454	Probe #8445 used t
c 26	60	4.3	1635	24	ABS16047	Human genome-deriv
c 27	60	4.3	1973	22	ABA44805	Human breast cell
c 28	60	4.3	1973	22	ABA55261	Human foetal liver
c 29	60	4.3	1973	22	ABA25005	Probe #3471 for ge
c 30	60	4.3	1973	22	AAK03514	Human brain expres
c 31	60	4.3	1973	22	AAK28970	Human bone marrow
c 32	60	4.3	1973	22	AAI13556	Probe #3489 for ge
c 33	60	4.3	1973	22	AAI34918	Probe #3604 used t
c 34	60	4.3	1973	22	AAI03446	Probe #3437 used t
c 35	60	4.3	1973	24	ABS03504	Human genome-deriv
36	57.6	4.1	117	21	AAA97071	G5 synthetic gene
c 37	56.6	4.0	95	21	AAA97074	G5 synthetic gene
c 38	56.6	4.0	8201	21	AAA88864	Human dentin sialo
c 39	56.6	4.0	8201	24	ABQ73537	Human dentin sialo
40	56.2	4.0	94	21	AAA97079	G5 synthetic gene
c 41	55.4	3.9	2215	24	ABI99688	Mouse ischaemic co
c 42	53.4	3.8	95	21	AAA97078	G5 synthetic gene
c 43	53.4	3.8	10266	17	AAT33007	Mouse SRY-related
c 44	53.4	3.8	14704	13	AAQ20685	PKS 741 insert con
45	52.6	3.7	92	21	AAA97087	G5 synthetic gene

ALIGNMENTS

RESULT 1
AAA97060
ID AAA97060 standard; DNA; 1410 BP.
XX
AC AAA97060;
XX
DT 18-DEC-2000 (first entry)
XX
DE 55kD i-antigen coding region.
XX
KW Immobilisation antigen; i-antigen; ichthyophthiriasis; vaccine; ds;
KW white spot disease; freshwater fish; immune response; infection control.
XX
OS Ichthyophthirius multifiliis.
XX
PN WO200046373-A1.
XX
PD 10-AUG-2000.
XX
PF 04-FEB-2000; 2000WO-US02962.
XX
PR 04-FEB-1999; 99US-0118634.
PR 02-MAR-1999; 99US-0122372.
PR 17-MAR-1999; 99US-0124905.
PR 27-APR-1999; 99US-0131121.
XX
PA (UYGE-) UNIV GEORGIA RES FOUND INC.
PA (CORR) CORNELL RES FOUND INC.
PA (CLAR/) CLARK T G.
PA (DICK/) DICKERSON H W.
PA (LINT/) LIN T.
XX

PI Clark TG, Dickerson HW, Lin T;
XX
DR WPI; 2000-506071/45.
XX
PT Novel i-antigen polypeptides and polynucleotides from Ichthyophthirius
PT multifiliis, useful for prophylaxis and treatment of Ichthyophthirius
PT infection in fish -
XX
PS Disclosure; Figure 2; 144pp; English.
XX
CC This invention relates to novel i-antigen polypeptide sequences.
CC I-antigens or immobilisation antigens ar common to a variety of
CC hymenostomatid ciliates and their expression varies in response to
CC environmental stimuli. This invention relates to i-antigens in
CC Ichthyophthirius multifiliis, a protozoan which is an obligate parasite
CC of freshwater fish causing ichthyophthiriasis or white spot disease. The
CC invention includes two polypeptide and polynucleotide sequences for two
CC i-antigens, of 48 and 55 kD. Also included in the invention are
CC antibodies capable of binding to the nucleotide sequences and a method
CC for identifying I. multifiliis serotypes using the nucleotide sequences.
CC A composition (containing the i-antigen nucleotide) capable of eliciting
CC an immune response in fish is useful for prophylaxis, treatment or for
CC controlling I. multifiliis infection in fish. Polynucleotide or protein
CC vaccines comprising a portion of the amplified product encoding an
CC antigenic i-antigen polypeptide obtained is also useful for treating or
CC preventing I. multifiliis infection in fish. Sequences AAA97036-A97042,
CC and AAA97060, AAA97065 and AAA97089 represent i-antigen genes and gene
CC fragments identified in the invention. Sequences AAA97043-A97064
CC (excluding AAA97060) and AAA97071-A97088 represent primers used in the
CC isolation of the i-antigen gene sequences. Sequences AAB25859-B25889 and
CC AAB25893-B25906 represent i-antigen protein and peptide sequences.
XX
SQ Sequence 1410 BP; 449 A; 240 C; 259 G; 462 T; 0 other;

Query Match 100.0%; Score 1410; DB 21; Length 1410;
Best Local Similarity 100.0%; Pred. No. 1.4e-300;
Matches 1410; Conservative 0; Mismatches 0; Indels 0; Gaps 0;

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Db       1 ATGAAAAATAATATTTTAGTAATATTGATTATTTCATTATTTATCAATTAAATTAAATCT 60

Qy      61 GCTAATTGTCCTGTTGGAACTGAAACTAACACAGCCGGATAAGTTGATGATCTAGGAACT 120
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Db      61 GCTAATTGTCCTGTTGGAACTGAAACTAACACAGCCGGATAAGTTGATGATCTAGGAACT 120

Qy     121 CCTGCAAATTGTGTTAATTGTTAGAAAAACTTTTATTATAATAATGCTGCTGCTTTCGTT 180
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Db     121 CCTGCAAATTGTGTTAATTGTTAGAAAAACTTTTATTATAATAATGCTGCTGCTTTCGTT 180

Qy     181 CCTGGTGCTAGTACGTGTACACCTTGTCCATAAAAAAAAGATGCTGGTGCTTAACCAAAT 240
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Db     181 CCTGGTGCTAGTACGTGTACACCTTGTCCATAAAAAAAAGATGCTGGTGCTTAACCAAAT 240

Qy     241 CCACCTGCTACTGCTAATTTAGTCACATAATGTAACGTTAAATGCCCTGCTGGTACCGCA 300
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Db     241 CCACCTGCTACTGCTAATTTAGTCACATAATGTAACGTTAAATGCCCTGCTGGTACCGCA 300

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Db     301 ATTGCAGGTGGAGCAACAGATTATGCAGCAATAATCACAGAATGTGTTAATTGTAGAATT 360

Qy     361 AATTTTTATAATGAAAATGCTCCAAATTTTAATGCAGGTGCTAGTACATGCACAGCTTGT 420
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Qy     421 CCGGTAAACAGAGTTGGTGGTGCATTGACTGCTGGTAATGCCGCTACCATAGTCGCATAA 480
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Qy     481 TGTAACGTCGCATGTCCTACTGGTACTGCACTTGATGATGGAGTAACTACTGATTATGTT 540
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Db     481 TGTAACGTCGCATGTCCTACTGGTACTGCACTTGATGATGGAGTAACTACTGATTATGTT 540

Qy     541 AGATCATTCACAGAATGTGTTAAATGTAGACTTAACTTTTACTATAATGGTAATAATGGT 600
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Db     541 AGATCATTCACAGAATGTGTTAAATGTAGACTTAACTTTTACTATAATGGTAATAATGGT 600

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Qy     661 AATGTTGCTTAAGCTACTTTAGGTAATGATGCTACAATAACCGCATAATGTAACGTTGCA 720
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Qy     721 TGCCCTGATGGTACTATAAGTGCTGCTGGAGTAAATAATTGGGTAGCACAAAACACTGAA 780
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Db     721 TGCCCTGATGGTACTATAAGTGCTGCTGGAGTAAATAATTGGGTAGCACAAAACACTGAA 780

Qy     781 TGTACTAATTGTGCTCCTAACTTTTACAATAATAATGCTCCTAATTTCAATCCAGGTAAT 840
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Db     781 TGTACTAATTGTGCTCCTAACTTTTACAATAATAATGCTCCTAATTTCAATCCAGGTAAT 840

Qy     841 AGTACATGCCTACCTTGCCCAGCAAATAAAGATTATGGTGCTGAAGCCACTGCAGGTGGT 900
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Qy     901 GCCGCTACTTTAGCCAAATAATGTAATATTGCATGCCCTGATGGTACTGCAATTGCTAGT 960
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Qy     961 GGAGCAACTAATTATGTAATATTATAAACAGAATGTCTAAATTGTGCTGCTAACTTTTAT 1020
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Db     961 GGAGCAACTAATTATGTAATATTATAAACAGAATGTCTAAATTGTGCTGCTAACTTTTAT 1020

Qy    1021 TTTGATGGTAATAATTTCTAGGCAGGAAGTAGTAGATGCAAAGCATGTCCAGCAAATAAA 1080
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Qy    1081 GTTTAAGGCGCTGTAGCAACTGCAGGTGGTACTGCTACTTTAATTGCATAATGTGCCCTT 1140
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Qy    1381 TTATTGATTTCTTATTATTTATTATGATGA 1410
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Db    1381 TTATTGATTTCTTATTATTTATTATGATGA 1410
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RESULT 2
AAA97038
ID AAA97038 standard; DNA; 1404 BP.
XX
AC AAA97038;
XX
DT 18-DEC-2000 (first entry)
XX
DE 55kD i-antigen nucleotide sequence.
XX
KW Immobilisation antigen; i-antigen; ichthyophthiriasis; vaccine; ds;

KW white spot disease; freshwater fish; immune response; infection control.
XX
OS Ichthyophthirius multifiliis.
XX
PN WO200046373-A1.
XX
PD 10-AUG-2000.
XX
PF 04-FEB-2000; 2000WO-US02962.
XX
PR 04-FEB-1999; 99US-0118634.
PR 02-MAR-1999; 99US-0122372.
PR 17-MAR-1999; 99US-0124905.
PR 27-APR-1999; 99US-0131121.
XX
PA (UYGE-) UNIV GEORGIA RES FOUND INC.
PA (CORR) CORNELL RES FOUND INC.
PA (CLAR/) CLARK T G.
PA (DICK/) DICKERSON H W.
PA (LINT/) LIN T.
XX
PI Clark TG, Dickerson HW, Lin T;
XX
DR WPI; 2000-506071/45.
XX
PT Novel i-antigen polypeptides and polynucleotides from Ichthyophthirius
PT multifiliis, useful for prophylaxis and treatment of Ichthyophthirius
PT infection in fish -
XX
PS Claim 5; Figure 3; 144pp; English.
XX
CC This invention relates to novel i-antigen polypeptide sequences.
CC I-antigens or immobilisation antigens ar common to a variety of
CC hymenostomatid ciliates and their expression varies in response to
CC environmental stimuli. This invention relates to i-antigens in
CC Ichthyophthirius multifiliis, a protozoan which is an obligate parasite
CC of freshwater fish causing ichthyophthiriasis or white spot disease. The
CC invention includes two polypeptide and polynucleotide sequences for two
CC i-antigens, of 48 and 55 kD. Also included in the invention are
CC antibodies capable of binding to the nucleotide sequences and a method
CC for identifying I. multifiliis serotypes using the nucleotide sequences.
CC A composition (containing the i-antigen nucleotide) capable of eliciting
CC an immune response in fish is useful for prophylaxis, treatment or for
CC controlling I. multifiliis infection in fish. Polynucleotide or protein
CC vaccines comprising a portion of the amplified product encoding an
CC antigenic i-antigen polypeptide obtained is also useful for treating or
CC preventing I. multifiliis infection in fish. Sequences AAA97036-A97042,
CC and AAA97060, AAA97065 and AAA97089 represent i-antigen genes and gene
CC fragments identified in the invention. Sequences AAA97043-A97064
CC (excluding AAA97060) and AAA97071-A97088 represent primers used in the
CC isolation of the i-antigen gene sequences. Sequences AAB25859-B25889 and
CC AAB25893-B25906 represent i-antigen protein and peptide sequences.
XX
SQ Sequence 1404 BP; 447 A; 240 C; 257 G; 460 T; 0 other;

Query Match 99.6%; Score 1404; DB 21; Length 1404;
Best Local Similarity 100.0%; Pred. No. 2.9e-299;
Matches 1404; Conservative 0; Mismatches 0; Indels 0; Gaps 0;

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Qy      61 GCTAATTGTCCTGTTGGAACTGAAACTAACACAGCCGGATAAGTTGATGATCTAGGAACT 120
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Db      61 GCTAATTGTCCTGTTGGAACTGAAACTAACACAGCCGGATAAGTTGATGATCTAGGAACT 120

Qy     121 CCTGCAAATTGTGTTAATTGTTAGAAAAACTTTTATTATAATAATGCTGCTGCTTTCGTT 180
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Db     121 CCTGCAAATTGTGTTAATTGTTAGAAAAACTTTTATTATAATAATGCTGCTGCTTTCGTT 180

Qy     181 CCTGGTGCTAGTACGTGTACACCTTGTCCATAAAAAAAAGATGCTGGTGCTTAACCAAAT 240
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Qy     241 CCACCTGCTACTGCTAATTTAGTCACATAATGTAACGTTAAATGCCCTGCTGGTACCGCA 300
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Qy     301 ATTGCAGGTGGAGCAACAGATTATGCAGCAATAATCACAGAATGTGTTAATTGTAGAATT 360
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Db     301 ATTGCAGGTGGAGCAACAGATTATGCAGCAATAATCACAGAATGTGTTAATTGTAGAATT 360

Qy     361 AATTTTTATAATGAAAATGCTCCAAATTTTAATGCAGGTGCTAGTACATGCACAGCTTGT 420
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Db     361 AATTTTTATAATGAAAATGCTCCAAATTTTAATGCAGGTGCTAGTACATGCACAGCTTGT 420

Qy     421 CCGGTAAACAGAGTTGGTGGTGCATTGACTGCTGGTAATGCCGCTACCATAGTCGCATAA 480
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Db     421 CCGGTAAACAGAGTTGGTGGTGCATTGACTGCTGGTAATGCCGCTACCATAGTCGCATAA 480

Qy     481 TGTAACGTCGCATGTCCTACTGGTACTGCACTTGATGATGGAGTAACTACTGATTATGTT 540
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Qy     541 AGATCATTCACAGAATGTGTTAAATGTAGACTTAACTTTTACTATAATGGTAATAATGGT 600
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Qy     601 AATACTCCTTTCAATCCAGGTAAAAGTTAATGCACACCTTGTCCGGCAATTAAACCTGCT 660
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Db     781 TGTACTAATTGTGCTCCTAACTTTTACAATAATAATGCTCCTAATTTCAATCCAGGTAAT 840

Qy     841 AGTACATGCCTACCTTGCCCAGCAAATAAAGATTATGGTGCTGAAGCCACTGCAGGTGGT 900
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Db     901 GCCGCTACTTTAGCCAAATAATGTAATATTGCATGCCCTGATGGTACTGCAATTGCTAGT 960

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Db    1021 TTTGATGGTAATAATTTCTAGGCAGGAAGTAGTAGATGCAAAGCATGTCCAGCAAATAAA 1080

Qy    1081 GTTTAAGGCGCTGTAGCAACTGCAGGTGGTACTGCTACTTTAATTGCATAATGTGCCCTT 1140
          ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db    1081 GTTTAAGGCGCTGTAGCAACTGCAGGTGGTACTGCTACTTTAATTGCATAATGTGCCCTT 1140

Qy    1141 GAATGCCCTGCTGGTACTGTACTCACCGATGGAACAACATCTACTTATAAATAAGCAGCA 1200
          ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db    1141 GAATGCCCTGCTGGTACTGTACTCACCGATGGAACAACATCTACTTATAAATAAGCAGCA 1200

Qy    1201 TCTGAATGTGTTAAATGTGCTGCCAACTTTTATACTACAAAATAAACTGATTGGGTAGCA 1260
          ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db    1201 TCTGAATGTGTTAAATGTGCTGCCAACTTTTATACTACAAAATAAACTGATTGGGTAGCA 1260

Qy    1261 GGTATTGATACATGTACTAGTTGTAATAAAAAATTAACTTCTGGCGCTGAAGCTAATTTA 1320
          ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db    1261 GGTATTGATACATGTACTAGTTGTAATAAAAAATTAACTTCTGGCGCTGAAGCTAATTTA 1320
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Qy   1321 CCTGAATCTGCTAAAAAAAATATATAATGTGATTTCGCTAATTTTTTATCAATTTCCTTA 1380
          ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db   1321 CCTGAATCTGCTAAAAAAAATATATAATGTGATTTCGCTAATTTTTTATCAATTTCCTTA 1380

Qy   1381 TTATTGATTTCTTATTATTTATTA 1404
          |||||||||||||||||||||||||
Db   1381 TTATTGATTTCTTATTATTTATTA 1404
```

RESULT 3
AAA52136
ID AAA52136 standard; DNA; 1404 BP.
XX
AC AAA52136;
XX
DT 04-DEC-2000 (first entry)
XX
DE 55 kDa i-antigen gene.
XX
KW BTU1; beta-tubulin; protein expression system; negative selection;
KW paclitaxel sensitivity; cell surface; antigen; protozoa; ciliate;
KW live vaccine; Ichthyophthiius multifiliis; immobilization-antigen;
KW i-antigen; freshwater; fish; protozoacide; ds.
XX
OS Ichthyophthiius multifiliis.
XX
FH Key   Location/Qualifiers
FT CDS   1..1404
FT   /*tag= a
FT   /codon= (seq:"TAA", aa:Gln)
FT   /product= 55_kDa_i-antigen
FT   /partial
XX
PN WO200046381-A1.
XX
PD 10-AUG-2000.
XX
PF 04-FEB-2000; 2000WO-US02966.
XX
PR 04-FEB-1999; 99US-0118634.
PR 02-MAR-1999; 99US-0122372.
PR 17-MAR-1999; 99US-0124905.
PR 27-APR-1999; 99US-0131121.
XX
PA (UYGE-) UNIV GEORGIA RES FOUND INC.
PA (GAER/) GAERTIG J.
PA (DICK/) DICKERSON H W.
PA (CLAR/) CLARK T G.
XX
PI Gaertig J, Dickerson HW, Clark TG;
XX
DR WPI; 2000-514962/46.
DR P-PSDB; AAY97177.
XX
PT Recombinant expression systems for expressing heterologous nucleic
PT acids and producing recombinant protein, comprises nonpathogenic
PT protozoa such as Tetrahymena resistant to paclitaxel
XX
PS Disclosure; Fig 3B; 83pp; English.
XX
CC Tetrahymena thermophila expresses two major beta-tubulin genes (BTU1 and
CC BTU2), which encode identical beta-tubulin proteins. Either of these two
CC genes (but not both at once) can be disrupted without a detectable change
CC in the cell phenotype. A K350L substitution in the BTU1 beta-tubulin
CC protein confers increased resistance to microtubule-depolymerizing drugs
CC and increased sensitivity to paclitaxel, a microtubule-stabilizing drug.
CC Cells carrying the Btu1-1K350M allele can be transformed to paclitaxel
CC resistance by gene replacement of Btu1-1K350M with a wild-type BTU1 gene
CC fragment, eliminating the need to incorporate a means for positive
CC selection. Where the host organism is not a T. thermophila mutant
CC containing the Btu1-1K350M allele, BTU1::neo1 construct, which
CC substitutes the coding region of the neo1 gene (conferring resistance to
CC parmomycin) for that of BTU1, can be used to generate BTU1 gene knockouts
CC and for positive selection. Heterologous nucleic acids (especially
CC encoding antigenic polypeptides) can be inserted into a BTU gene for
CC successful cell-surface expression that is maintained by way of negative
CC selection. Preferred expression vectors disrupt the Btu1-1K350M gene by
CC homologous recombination-mediated insertion of a heterologous nucleic
CC acid, thereby restoring resistance to paclitaxel in the resulting
CC transgenic host. Transgenic ciliated protozoa are useful as live vaccines
CC for stimulating an immune response in a vertebrate. The transgenic
CC protozoan host cells are also useful for producing polyclonal antibodies
CC (claimed). In particular, Tetrahymena expressing Ichthyophthiius
CC multifiliis immobilization-antigen (i-antigen) protein on their surface
CC are effective vehicles for vaccination of freshwater fish against
CC infection by I. multifiliis.
XX
SQ Sequence 1404 BP; 447 A; 241 C; 256 G; 460 T; 0 other;

Query Match 99.5%; Score 1402.4; DB 21; Length 1404;
Best Local Similarity 99.9%; Pred. No. 6.5e-299;
Matches 1403; Conservative 0; Mismatches 1; Indels 0; Gaps 0;

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Qy      1 ATGAAAAATAATATTTTAGTAATATTGATTATTTCATTATTTATCAATTAAATTAAATCT 60
          ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db      1 ATGAAAAATAATATTTTAGTAATATTGATTATTTCATTATTTATCAATTAAATTAAATCT 60

Qy     61 GCTAATTGTCCTGTTGGAACTGAAACTAACACAGCCGGATAAGTTGATGATCTAGGAACT 120
          ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db     61 GCTAATTGTCCTGTTGGAACTGAAACTAACACAGCCGGATAAGTTGATGATCTAGGAACT 120

Qy    121 CCTGCAAATTGTGTTAATTGTTAGAAAAACTTTTATTATAATAATGCTGCTGCTTTCGTT 180
          ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db    121 CCTGCAAATTGTGTTAATTGTTAGAAAAACTTTTATTATAATAATGCTGCTGCTTTCGTT 180

Qy    181 CCTGGTGCTAGTACGTGTACACCTTGTCCATAAAAAAAAGATGCTGGTGCTTAACCAAAT 240
          ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db    181 CCTGGTGCTAGTACGTGTACACCTTGTCCATAAAAAAAAGATGCTGGTGCTTAACCAAAT 240

Qy    241 CCACCTGCTACTGCTAATTTAGTCACATAATGTAACGTTAAATGCCCTGCTGGTACCGCA 300
          ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db    241 CCACCTGCTACTGCTAATTTAGTCACATAATGTAACGTTAAATGCCCTGCTGGTACCGCA 300

Qy    301 ATTGCAGGTGGAGCAACAGATTATGCAGCAATAATCACAGAATGTGTTAATTGTAGAATT 360
          ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db    301 ATTGCAGGTGGAGCAACAGATTATGCAGCAATAATCACAGAATGTGTTAATTGTAGAATT 360

Qy    361 AATTTTTATAATGAAAATGCTCCAAATTTTAATGCAGGTGCTAGTACATGCACAGCTTGT 420
          ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db    361 AATTTTTATAATGAAAATGCTCCAAATTTTAATGCAGGTGCTAGTACATGCACAGCTTGT 420

Qy    421 CCGGTAAACAGAGTTGGTGGTGCATTGACTGCTGGTAATGCCGCTACCATAGTCGCATAA 480
          ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db    421 CCGGTAAACAGAGTTGGTGGTGCATTGACTGCTGGTAATGCCGCTACCATAGTCGCATAA 480

Qy    481 TGTAACGTCGCATGTCCTACTGGTACTGCACTTGATGATGGAGTAACTACTGATTATGTT 540
          ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db    481 TGTAACGTCGCATGTCCTACTGGTACTGCACTTGATGATGGAGTAACTACTGATTATGTT 540

Qy    541 AGATCATTCACAGAATGTGTTAAATGTAGACTTAACTTTTACTATAATGGTAATAATGGT 600
          ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db    541 AGATCATTCACAGAATGTGTTAAATGTAGACTTAACTTTTACTATAATGGTAATAATGGT 600

Qy    601 AATACTCCTTTCAATCCAGGTAAAAGTTAATGCACACCTTGTCCGGCAATTAAACCTGCT 660
          |||||||||||||||||||||||||||||||||||| ||||||||||||||||||||||
Db    601 AATACTCCTTTCAATCCAGGTAAAAGTTAATGCACACCTTGTCCCGCAATTAAACCTGCT 660

Qy    661 AATGTTGCTTAAGCTACTTTAGGTAATGATGCTACAATAACCGCATAATGTAACGTTGCA 720
          ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db    661 AATGTTGCTTAAGCTACTTTAGGTAATGATGCTACAATAACCGCATAATGTAACGTTGCA 720

Qy    721 TGCCCTGATGGTACTATAAGTGCTGCTGGAGTAAATAATTGGGTAGCACAAAACACTGAA 780
          ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db    721 TGCCCTGATGGTACTATAAGTGCTGCTGGAGTAAATAATTGGGTAGCACAAAACACTGAA 780
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Qy    781 TGTACTAATTGTGCTCCTAACTTTTACAATAATAATGCTCCTAATTTCAATCCAGGTAAT 840
          ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db    781 TGTACTAATTGTGCTCCTAACTTTTACAATAATAATGCTCCTAATTTCAATCCAGGTAAT 840

Qy    841 AGTACATGCCTACCTTGCCCAGCAAATAAAGATTATGGTGCTGAAGCCACTGCAGGTGGT 900
          ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db    841 AGTACATGCCTACCTTGCCCAGCAAATAAAGATTATGGTGCTGAAGCCACTGCAGGTGGT 900

Qy    901 GCCGCTACTTTAGCCAAATAATGTAATATTGCATGCCCTGATGGTACTGCAATTGCTAGT 960
          ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db    901 GCCGCTACTTTAGCCAAATAATGTAATATTGCATGCCCTGATGGTACTGCAATTGCTAGT 960

Qy    961 GGAGCAACTAATTATGTAATATTATAAACAGAATGTCTAAATTGTGCTGCTAACTTTTAT 1020
          ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db    961 GGAGCAACTAATTATGTAATATTATAAACAGAATGTCTAAATTGTGCTGCTAACTTTTAT 1020

Qy   1021 TTTGATGGTAATAATTTCTAGGCAGGAAGTAGTAGATGCAAAGCATGTCCAGCAAATAAA 1080
          ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db   1021 TTTGATGGTAATAATTTCTAGGCAGGAAGTAGTAGATGCAAAGCATGTCCAGCAAATAAA 1080

Qy   1081 GTTTAAGGCGCTGTAGCAACTGCAGGTGGTACTGCTACTTTAATTGCATAATGTGCCCTT 1140
          ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db   1081 GTTTAAGGCGCTGTAGCAACTGCAGGTGGTACTGCTACTTTAATTGCATAATGTGCCCTT 1140

Qy   1141 GAATGCCCTGCTGGTACTGTACTCACCGATGGAACAACATCTACTTATAAATAAGCAGCA 1200
          ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db   1141 GAATGCCCTGCTGGTACTGTACTCACCGATGGAACAACATCTACTTATAAATAAGCAGCA 1200

Qy   1201 TCTGAATGTGTTAAATGTGCTGCCAACTTTTATACTACAAAATAAACTGATTGGGTAGCA 1260
          ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db   1201 TCTGAATGTGTTAAATGTGCTGCCAACTTTTATACTACAAAATAAACTGATTGGGTAGCA 1260

Qy   1261 GGTATTGATACATGTACTAGTTGTAATAAAAAATTAACTTCTGGCGCTGAAGCTAATTTA 1320
          ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db   1261 GGTATTGATACATGTACTAGTTGTAATAAAAAATTAACTTCTGGCGCTGAAGCTAATTTA 1320

Qy   1321 CCTGAATCTGCTAAAAAAAAATATATAATGTGATTTCGCTAATTTTTTTATCAATTTCCTTA 1380
          ||||||||||||||||||||||||||||||||||||||||||||||||||||||||||||
Db   1321 CCTGAATCTGCTAAAAAAAAATATATAATGTGATTTCGCTAATTTTTTTATCAATTTCCTTA 1380

Qy   1381 TTATTGATTTCTTATTATTTATTA 1404
          |||||||||||||||||||||||||
Db   1381 TTATTGATTTCTTATTATTTATTA 1404
```

RESULT 4
AAA97089
ID AAA97089 standard; DNA; 1410 BP.
XX
AC AAA97089;
XX
DT 18-DEC-2000 (first entry)
XX
DE Synthetic I. Multifiliis G5 isolate i-antigen gene.
XX
KW Immobilisation antigen; i-antigen; ichthyophthiriasis; vaccine; ds;
KW white spot disease; freshwater fish; immune response; infection control.
XX
OS Ichthyophthirius multifiliis.
OS Synthetic.
XX
PN WO200046373-A1.
XX
PD 10-AUG-2000.
XX
PF 04-FEB-2000; 2000WO-US02962.
XX
PR 04-FEB-1999; 99US-0118634.
PR 02-MAR-1999; 99US-0122372.
PR 17-MAR-1999; 99US-0124905.
PR 27-APR-1999; 99US-0131121.
XX
PA (UYGE-) UNIV GEORGIA RES FOUND INC.
PA (CORR) CORNELL RES FOUND INC.
PA (CLAR/) CLARK T G.
PA (DICK/) DICKERSON H W.
PA (LINT/) LIN T.
XX
PI Clark TG, Dickerson HW, Lin T;
XX
DR WPI; 2000-506071/45.
XX
PT Novel i-antigen polypeptides and polynucleotides from Ichthyophthirius
PT multifiliis, useful for prophylaxis and treatment of Ichthyophthirius
PT infection in fish -
XX
PS Example 5; Figure 2b; 144pp; English.
XX
CC This invention relates to novel i-antigen polypeptide sequences.
CC I-antigens or immobilisation antigens ar common to a variety of
CC hymenostomatid ciliates and their expression varies in response to
CC environmental stimuli. This invention relates to i-antigens in
CC Ichthyophthirius multifiliis, a protozoan which is an obligate parasite
CC of freshwater fish causing ichthyophthiriasis or white spot disease. The
CC invention includes two polypeptide and polynucleotide sequences for two
CC i-antigens, of 48 and 55 kD. Also included in the invention are
CC antibodies capable of binding to the nucleotide sequences and a method
CC for identifying I. multifiliis serotypes using the nucleotide sequences.
CC A composition (containing the i-antigen nucleotide) capable of eliciting
CC an immune response in fish is useful for prophylaxis, treatment or for
CC controlling I. multifiliis infection in fish. Polynucleotide or protein
CC vaccines comprising a portion of the amplified product encoding an
CC antigenic i-antigen polypeptide obtained is also useful for treating or
CC preventing I. multifiliis infection in fish. Sequences AAA97036-A97042,
CC and AAA97060, AAA97065 and AAA97089 represent i-antigen genes and gene
CC fragments identified in the invention. Sequences AAA97043-A97064
CC (excluding AAA97060) and AAA97071-A97088 represent primers used in the
CC isolation of the i-antigen gene sequences. Sequences AAB25859-B25889 and
CC AAB25893-B25906 represent i-antigen protein and peptide sequences.
XX
SQ Sequence 1410 BP; 321 A; 418 C; 339 G; 332 T; 0 other;

Query Match 55.6%; Score 784.4; DB 21; Length 1410;
Best Local Similarity 72.3%; Pred. No. 5.2e-163;
Matches 1019; Conservative 0; Mismatches 391; Indels 0; Gaps 0;

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Qy      1 ATGAAAAATAATATTTTAGTAATATTGATTATTTCATTATTTATCAATTAAATTAAATCT 60
          ||||| || || ||  | || ||  |||| || ||  | || |||||  | || || |||
Db      1 ATGAAGAACAACATCCTGGTGATCCTGATCATCTCTCTGTTCATCAACCAGATCAAGTCT 60

Qy     61 GCTAATTGTCCTGTTGGAACTGAAACTAACACAGCCGGATAAGTTGATGATCTAGGAACT 120
          ||||| |||||||| ||||| || || ||||| || ||| | || || || || |||||
Db     61 GCTAACTGTCCTGTGGGAACCGAGACCAACACCGCTGGACAGGTGGACGACCTGGGAACC 120

Qy    121 CCTGCAAATTGTGTTAATTGTTAGAAAAACTTTTATTATAATAATGCTGCTGCTTTCGTT 180
          ||||| || ||||| || ||| |||| ||||| || || || || ||||||||||||||
Db    121 CCTGCTAACTGTGTGAACTGTCAGAAGAACTTCTACTACAACAACGCTGCTGCTTTCGTG 180

Qy    181 CCTGGTGCTAGTACGTGTACACCTTGTCCATAAAAAAAAGATGCTGGTGCTTAACCAAAT 240
          ||||| |||  ||| ||||| |||||||  | || || || ||||| ||| | || ||
Db    181 CCTGGAGCTTCTACCTGTACCCCTTGTCCTCAGAAGAAGGACGCTGGAGCTCAGCCTAAC 240

Qy    241 CCACCTGCTACTGCTAATTTAGTCACATAATGTAACGTTAAATGCCCTGCTGGTACCGCA 300
          || |||||||| |||||  | || ||  | |||||||| || || |||||||| |||||
Db    241 CCTCCTGCTACCGCTAACCTGGTGACCCAGTGTAACGTGAAGTGTCCTGCTGGAACCGCT 300

Qy    301 ATTGCAGGTGGAGCAACAGATTATGCAGCAATAATCACAGAATGTGTTAATTGTAGAATT 360
          || || || ||||| || || || || || || ||||| || ||||| || ||| | ||
Db    301 ATCGCTGGAGGAGCTACCGACTACGCTGCTATCATCACCGAGTGTGTGAACTGTCGCATC 360

Qy    361 AATTTTTATAATGAAAATGCTCCAAATTTTAATGCAGGTGCTAGTACATGCACAGCTTGT 420
          || || || || || || ||||| || || || || || ||| ||| || || ||||||
Db    361 AACTTCTACAACGAGAACGCTCCTAACTTCAACGCTGGAGCTTCTACCTGTACCGCTTGT 420

Qy    421 CCGGTAAACAGAGTTGGTGGTGCATTGACTGCTGGTAATGCCGCTACCATAGTCGCATAA 480
          || || ||| | || || || ||  |||| ||||| || || |||||||| || ||  |
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Db    421 CCTGTGAACCGCGTGGGAGGAGCTCTGACCGCTGGAAACGCTGCTACCATCGTGGCTCAG 480

Qy    481 TGTAACGTCGCATGTCCTACTGGTACTGCACTTGATGATGGAGTAACTACTGATTATGTT 540

Db    481 TGTAACGTGGCTTGTCCTACCGGAACCGCTCTGGACGACGGAGTGACCACCGACTACGTG 540

Qy    541 AGATCATTCACAGAATGTGTTAAATGTAGACTTAACTTTTACTATAATGGTAATAATGGT 600

Db    541 CGCTCTTTCACCGAGTGTGTGAAGTGTCGCCTGAACTTCTACTACAACGGAAACAACGGA 600

Qy    601 AATACTCCTTTCAATCCAGGTAAAAGTTAATGCACACCTTGTCCGGCAATTAAACCTGCT 660

Db    601 AACACCCCTTTCAACCCTGGAAAGTCTCAGTGTACCCCTTGTCCTGCTATCAAGCCTGCT 660

Qy    661 AATGTTGCTTAAGCTACTTTAGGTAATGATGCTACAATAACCGCATAATGTAACGTTGCA 720

Db    661 AACGTGGCTCAGGCTACCCTGGGAAACGACGCTACCATCACCGCTCAGTGTAACGTGGCT 720

Qy    721 TGCCCTGATGGTACTATAAGTGCTGCTGGAGTAAATAATTGGGTAGCACAAAACACTGAA 780

Db    721 TGTCCTGACGGAACCATCTCTGCTGCTGGAGTGAACAACTGGGTGGCTCAGAACACCGAG 780

Qy    781 TGTACTAATTGTGCTCCTAACTTTTACAATAATAATGCTCCTAATTTCAATCCAGGTAAT 840

Db    781 TGTACCAACTGTGCTCCTAACTTCTACAACAACAACGCTCCTAACTTCAACCCTGGAAAC 840

Qy    841 AGTACATGCCTACCTTGCCCAGCAAATAAAGATTATGGTGCTGAAGCCACTGCAGGTGGT 900

Db    841 TCTACCTGTCTGCCTTGTCCTGCTAACAAGGACTACGGAGCTGAGGCTACCGCTGGAGGA 900

Qy    901 GCCGCTACTTTAGCCAAATAATGTAATATTGCATGCCCTGATGGTACTGCAATTGCTAGT 960

Db    901 GCTGCTACCCTGGCTAAGCAGTGTAACATCGCTTGTCCTGACGGAACCGCTATCGCTTCT 960

Qy    961 GGAGCAACTAATTATGTAATATTATAAACAGAATGTCTAAATTGTGCTGCTAACTTTTAT 1020

Db    961 GGAGCTACCAACTACGTGATCCTGCAGACCGAGTGTCTGAACTGTGCTGCTAACTTCTAC 1020

Qy   1021 TTTGATGGTAATAATTTCTAGGCAGGAAGTAGTAGATGCAAAGCATGTCCAGCAAATAAA 1080

Db   1021 TTCGACGGAAACAACTTCCAGGCTGGATCTTCTCGCTGTAAGGCTTGTCCTGCTAACAAG 1080

Qy   1081 GTTTAAGGCGCTGTAGCAACTGCAGGTGGTACTGCTACTTTAATTGCATAATGTGCCCTT 1140

Db   1081 GTGCAGGGAGCTGTGGCTACCGCTGGAGGAACCGCTACCCTGATCGCTCAGTGTGCTCTG 1140

Qy   1141 GAATGCCCTGCTGGTACTGTACTCACCGATGGAACAACATCTACTTATAAATAAGCAGCA 1200

Db   1141 GAGTGTCCTGCTGGAACCGTGCTGACCGACGGAACCACCTCTACCTACAAGCAGGCTGCT 1200

Qy   1201 TCTGAATGTGTTAAATGTGCTGCCAACTTTTATACTACAAAATAAACTGATTGGGTAGCA 1260

Db   1201 TCTGAGTGTGTGAAGTGTGCTGCTAACTTCTACACCACCAAGCAGACCGACTGGGTGGCT 1260

Qy   1261 GGTATTGATACATGTACTAGTTGTAATAAAAAATTAACTTCTGGCGCTGAAGCTAATTTA 1320

Db   1261 GGAATCGACACCTGTACCTCTTGTAACAAGAAGCTGACCTCTGGAGCTGAGGCTAACCTG 1320

Qy   1321 CCTGAATCTGCTAAAAAAAATATATAATGTGATTTCGCTAATTTTTTATCAATTTCCTTA 1380

Db   1321 CCTGAGTCTGCTAAGAAGAACATCCAGTGTGACTTCGCTAACTTCCTGTCTATCTCTCTG 1380

Qy   1381 TTATTGATTTCTTATTATTTATTATGATGA 1410

Db   1381 CTGCTGATCTCTTACTACCTGCTGTAATAA 1410


RESULT 5
AAA97040
ID   AAA97040 standard; DNA; 1404 BP.
XX
AC   AAA97040;
XX
DT   18-DEC-2000  (first entry)
XX
DE   55kD i-antigen synthetic gene.
XX
KW   Immobilisation antigen; i-antigen; ichthyophthiriasis; vaccine; ds;
KW   white spot disease; freshwater fish; immune response; infection control.
XX
OS   Ichthyophthirius multifiliis.
OS   Synthetic.
XX
PN   WO200046373-A1.
XX
PD   10-AUG-2000.
XX
PF   04-FEB-2000; 2000WO-US02962.
XX
PR   04-FEB-1999;   99US-0118634.
PR   02-MAR-1999;   99US-0122372.
PR   17-MAR-1999;   99US-0124905.
PR   27-APR-1999;   99US-0131121.
XX
PA   (UYGE-) UNIV GEORGIA RES FOUND INC.
PA   (CORR ) CORNELL RES FOUND INC.
PA   (CLAR/) CLARK T G.
PA   (DICK/) DICKERSON H W.
PA   (LINT/) LIN T.
XX
PI   Clark TG,  Dickerson HW,  Lin T;
XX
DR   WPI; 2000-506071/45.
XX
PT   Novel i-antigen polypeptides and polynucleotides from Ichthyophthirius
PT   multifiliis, useful for prophylaxis and treatment of Ichthyophthirius
PT   infection in fish  -
XX
PS   Claim 5; Page 102; 144pp; English.
XX
CC   This invention relates to novel i-antigen polypeptide sequences.
CC   I-antigens or immobilisation antigens ar common to a variety of
CC   hymenostomatid ciliates and their expression varies in response to
CC   environmental stimuli. This invention relates to i-antigens in
CC   ichthyophthirius multifiliis, a protozoan which is an obligate parasite
CC   of freshwater fish causing ichthyophthiriasis or white spot disease. The
CC   invention includes two polypeptide and polynucleotide sequences for two
CC   i-antigens, of 48 and 55 kD. Also included in the invention are
CC   antibodies capable of binding to the nucleotide sequences and a method
CC   for identifying I. multifiliis serotypes using the nucleotide sequences.
CC   A composition (containing the i-antigen nucleotide) capable of eliciting
CC   an immune response in fish is useful for prophylaxis, treatment or for
CC   controlling I. multifiliis infection in fish. Polynucleotide or protein
CC   vaccines comprising a portion of the amplified product encoding an
CC   antigenic i-antigen polypeptide obtained is also useful for treating or
CC   preventing I. multifiliis infection in fish. Sequences AAA97036-A97042,
CC   and AAA97060, AAA97065 and AAA97089 represent i-antigen genes and gene
CC   fragments identified in the invention. Sequences AAA97043-A97064
CC   (excluding AAA97060) and AAA97071-A97088 represent primers used in the
CC   isolation of the i-antigen gene sequences. Sequences AAB25859-B25889 and
CC   AAB25893-B25906 represent i-antigen protein and peptide sequences.
XX
SQ   Sequence 1404 BP; 317 A; 418 C; 339 G; 330 T; 0 other;

  Query Match           55.5%;  Score 782.6;  DB 21;  Length 1404;
  Best Local Similarity   72.5%;  Pred. No. 1.3e-162;
  Matches 1013;  Conservative    0;  Mismatches  384;  Indels    0;  Gaps    0;

Qy      1 ATGAAAAATAATATTTTAGTAATATTGATTATTTCATTATTTATCAATTAAATTAAATCT 60

Db      1 ATGAAGAACAACATCCTGGTGATCCTGATCATCTCTCTGTTCATCAACCAGATCAAGTCT 60

Qy     61 GCTAATTGTCCTGTTGGAACTGAAACTAACACAGCCGGATAAGTTGATGATCTAGGAACT 120

Db     61 GCTAACTGTCCTGTGGGAACCGAGACCAACACCGCTGGACAGGTGGACGACCTGGGAACC 120
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Qy    121 CCTGCAAATTGTGTTAATTGTTAGAAAAACTTTTATTATAATAATGCTGCTGCTTTCGTT 180
          ||||| || ||||| || ||| |||| ||||| || || || || ||||||||||||||
Db    121 CCTGCTAACTGTGTGAACTGTCAGAAGAACTTCTACTACAACAACGCTGCTGCTTTCGTG 180

Qy    181 CCTGGTGCTAGTACGTGTACACCTTGTCCATAAAAAAAAGATGCTGGTGCTTAACCAAAT 240
          ||||| |||  ||| |||||  |||||||  | || || || ||||| ||| | || ||
Db    181 CCTGGAGCTTCTACCTGTACCCCTTGTCCTCAGAAGAAGGACGCTGGAGCTCAGCCTAAC 240

Qy    241 CCACCTGCTACTGCTAATTTAGTCACATAATGTAACGTTAAATGCCCTGCTGGTACCGCA 300
          || |||||||| |||||  | || ||  | |||||||| || || |||||||| |||||
Db    241 CCTCCTGCTACCGCTAACCTGGTGACCCAGTGTAACGTGAAGTGTCCTGCTGGAACCGCT 300

Qy    301 ATTGCAGGTGGAGCAACAGATTATGCAGCAATAATCACAGAATGTGTTAATTGTAGAATT 360
          || || || ||||| || || || || || || ||||| || ||||| || ||| | ||
Db    301 ATCGCTGGAGGAGCTACCGACTACGCTGCTATCATCACCGAGTGTGTGAACTGTCGCATC 360

Qy    361 AATTTTTATAATGAAAATGCTCCAAATTTTAATGCAGGTGCTAGTACATGCACAGCTTGT 420
          || || || || || || ||||| || || || || || ||| ||| || || ||||||
Db    361 AACTTCTACAACGAGAACGCTCCTAACTTCAACGCTGGAGCTTCTACCTGTACCGCTTGT 420

Qy    421 CCGGTAAACAGAGTTGGTGGTGCATTGACTGCTGGTAATGCCGCTACCATAGTCGCATAA 480
          || || ||| | || || || ||  |||| ||||| || || |||||||| || ||  |
Db    421 CCTGTGAACCGCGTGGGAGGAGCTCTGACCGCTGGAAACGCTGCTACCATCGTGGCTCAG 480

Qy    481 TGTAACGTCGCATGTCCTACTGGTACTGCACTTGATGATGGAGTAACTACTGATTATGTT 540
          |||||||| || |||||||| || || || || || || ||||| || || || || ||
Db    481 TGTAACGTGGCTTGTCCTACCGGAACCGCTCTGGACGACGGAGTGACCACCGACTACGTG 540

Qy    541 AGATCATTCACAGAATGTGTTAAATGTAGACTTAACTTTTACTATAATGGTAATAATGGT 600
          | || ||||| || ||||| || ||| | || ||||| ||||| || || || || ||
Db    541 CGCTCTTTCACCGAGTGTGTGAAGTGTCGCCTGAACTTCTACTACAACGGAAACAACGGA 600

Qy    601 AATACTCCTTTCAATCCAGGTAAAAGTTAATGCACACCTTGTCCGGCAATTAAACCTGCT 660
          || || |||||||| || || ||   | | || || |||||||| || || || ||||||
Db    601 AACACCCCTTTCAACCCTGGAAAGTCTCAGTGTACCCCTTGTCCTGCTATCAAGCCTGCT 660

Qy    661 AATGTTGCTTAAGCTACTTTAGGTAATGATGCTACAATAACCGCATAATGTAACGTTGCA 720
          || || ||| | |||||  | || || || ||||| || |||||  | |||||||| ||
Db    661 AACGTGGCTCAGGCTACCCTGGGAAACGACGCTACCATCACCGCTCAGTGTAACGTGGCT 720

Qy    721 TGCCCTGATGGTACTATAAGTGCTGCTGGAGTAAATAATTGGGTAGCACAAAACACTGAA 780
          || ||||| || || ||   ||||||||||||| || || ||||| || || ||||| ||
Db    721 TGTCCTGACGGAACCATCTCTGCTGCTGGAGTGAACAACTGGGTGGCTCAGAACACCGAG 780

Qy    781 TGTACTAATTGTGCTCCTAACTTTTACAATAATAATGCTCCTAATTTCAATCCAGGTAAT 840
          ||||| || ||||||||||||||| ||||| || || |||||||| ||||| || || ||
Db    781 TGTACCAACTGTGCTCCTAACTTCTACAACAACAACGCTCCTAACTTCAACCCTGGAAAC 840

Qy    841 AGTACATGCCTACCTTGCCCAGCAAATAAAGATTATGGTGCTGAAGCCACTGCAGGTGGT 900
            ||| || || ||||| || || || || || || || ||||| || || || || ||
Db    841 TCTACCTGTCTGCCTTGTCCTGCTAACAAGGACTACGGAGCTGAGGCTACCGCTGGAGGA 900

Qy    901 GCCGCTACTTTAGCCAAATAATGTAATATTGCATGCCCTGATGGTACTGCAATTGCTAGT 960
          || |||||  | || ||  | ||||| || || || ||||| || || || || |||  |
Db    901 GCTGCTACCCTGGCTAAGCAGTGTAACATCGCTTGTCCTGACGGAACCGCTATCGCTTCT 960

Qy    961 GGAGCAACTAATTATGTAATATTATAAACAGAATGTCTAAATTGTGCTGCTAACTTTTAT 1020
          ||||| || || || || ||  |  | || || ||||| || ||||||||||||||| ||
Db    961 GGAGCTACCAACTACGTGATCCTGCAGACCGAGTGTCTGAACTGTGCTGCTAACTTCTAC 1020

Qy   1021 TTTGATGGTAATAATTTCTAGGCAGGAAGTAGTAGATGCAAAGCATGTCCAGCAAATAAA 1080
          || || || || || ||| |||| |||  |  | | || || || ||||| || || ||
Db   1021 TTCGACGGAAACAACTTCCAGGCTGGATCTTCTCGCTGTAAGGCTTGTCCTGCTAACAAG 1080

Qy   1081 GTTTAAGGCGCTGTAGCAACTGCAGGTGGTACTGCTACTTTAATTGCATAATGTGCCCTT 1140
          ||  | || ||||| || || || || || || ||||| | || ||  | ||||| ||
Db   1081 GTGCAGGGAGCTGTGGCTACCGCTGGAGGAACCGCTACCCTGATCGCTCAGTGTGCTCTG 1140

Qy   1141 GAATGCCCTGCTGGTACTGTACTCACCGATGGAACAACATCTACTTATAAATAAGCAGCA 1200
          || || |||||||| || || || ||||| ||||| || ||||| || ||  | || ||
Db   1141 GAGTGTCCTGCTGGAACCGTGCTGACCGACGGAACCACCTCTACCTACAAGCAGGCTGCT 1200

Qy   1201 TCTGAATGTGTTAAATGTGCTGCCAACTTTTATACTACAAAATAAACTGATTGGGTAGCA 1260
          ||||| ||||| || |||||||| ||||| || || || ||  | || || ||||| ||
Db   1201 TCTGAGTGTGTGAAGTGTGCTGCTAACTTCTACACCACCAAGCAGACCGACTGGGTGGCT 1260

Qy   1261 GGTATTGATACATGTACTAGTTGTAATAAAAAATTAACTTCTGGCGCTGAAGCTAATTTA 1320
          || || || || |||||  |||||| || ||  | || ||||| ||||| |||||  |
Db   1261 GGAATCGACACCTGTACCTCTTGTAACAAGAAGCTGACCTCTGGAGCTGAGGCTAACCTG 1320

Qy   1321 CCTGAATCTGCTAAAAAAAATATATAATGTGATTTCGCTAATTTTTTATCAATTTCCTTA 1380
          ||||| |||||||| || || ||  | ||||| |||||||| ||  | || || ||  |
Db   1321 CCTGAGTCTGCTAAGAAGAACATCCAGTGTGACTTCGCTAACTTCCTGTCTATCTCTCTG 1380

Qy   1381 TTATTGATTTCTTATTA 1397
             |  |||| ||||| ||
Db   1381 CTGCTGATCTCTTACTA 1397
```

RESULT 6
AAA97065
ID AAA97065 standard; DNA; 1404 BP.
XX
AC AAA97065;
XX
DT 18-DEC-2000 (first entry)
XX
DE Synthetic 55kD i-antigen gene sequence.
XX
KW Immobilisation antigen; i-antigen; ichthyophthiriasis; vaccine; ds;
KW white spot disease; freshwater fish; immune response; infection control.
XX
OS Ichthyophthirius multifilliis.
OS Synthetic.
XX
PN WO200046373-A1.
XX
PD 10-AUG-2000.
XX
PF 04-FEB-2000; 2000WO-US02962.
XX
PR 04-FEB-1999; 99US-0118634.
PR 02-MAR-1999; 99US-0122372.
PR 17-MAR-1999; 99US-0124905.
PR 27-APR-1999; 99US-0131121.
XX
PA (UYGE-) UNIV GEORGIA RES FOUND INC.
PA (CORR) CORNELL RES FOUND INC.
PA (CLAR/) CLARK T G.
PA (DICK/) DICKERSON H W.
PA (LINT/) LIN T.
XX
PI Clark TG, Dickerson HW, Lin T;
XX
DR WPI; 2000-506071/45.
XX
PT Novel i-antigen polypeptides and polynucleotides from Ichthyophthirius
PT multifiliis, useful for prophylaxis and treatment of Ichthyophthirius
PT infection in fish -
XX
PS Example 5; Figure 13; 144pp; English.
XX
CC This invention relates to novel i-antigen polypeptide sequences.
CC I-antigens or immobilisation antigens ar common to a variety of
CC hymenostomatid ciliates and their expression varies in response to
CC environmental stimuli. This invention relates to i-antigens in
CC Ichthyophthirius multifiliis, a protozoan which is an obligate parasite
CC of freshwater fish causing ichthyophthiriasis or white spot disease. The
CC invention includes two polypeptide and polynucleotide sequences for two
CC i-antigens, of 48 and 55 kD. Also included in the invention are
CC antibodies capable of binding to the nucleotide sequences and a method
CC for identifying I. multifiliis serotypes using the nucleotide sequences.
CC A composition (containing the i-antigen nucleotide) capable of eliciting
CC an immune response in fish is useful for prophylaxis, treatment or for
CC controlling I. multifiliis infection in fish. Polynucleotide or protein
CC vaccines comprising a portion of the amplified product encoding an

```
CC   antigenic i-antigen polypeptide obtained is also useful for treating or
CC   preventing I. multifiliis infection in fish. Sequences AAA97036-A97042,
CC   and AAA97060, AAA97065 and AAA97089 represent i-antigen genes and gene
CC   fragments identified in the invention. Sequences AAA97043-A97064
CC   (excluding AAA97060) and AAA97071-A97088 represent primers used in the
CC   isolation of the i-antigen gene sequences. Sequences AAB25859-B25889 and
CC   AAB25893-B25906 represent i-antigen protein and peptide sequences.
XX
SQ   Sequence 1404 BP; 317 A; 418 C; 339 G; 330 T; 0 other;

  Query Match           55.4%;  Score 781;  DB 21;  Length 1404;
  Best Local Similarity  72.4%;  Pred. No. 2.9e-162;
  Matches 1012;  Conservative    0;  Mismatches  385;  Indels    0;  Gaps    0;

Qy       1 ATGAAAAATAATATTTTAGTAATATTGATTATTTCATTATTTATCAATTAAATTAAATCT 60
Db       1 ATGAAGAACAACATCCCGGTGATCCTGATCATCTCTCTGTTCATCAACCAGATCAAGTCT 60

Qy      61 GCTAATTGTCCTGTTGGAACTGAAACTAACACAGCCGGATAAGTTGATGATCTAGGAACT 120
Db      61 GCTAACTGTCCTGTGGGAACCGAGACCAACACCGCTGGACAGGTGGACGACCTGGGAACC 120

Qy     121 CCTGCAAATTGTGTTAATTGTTAGAAAAACTTTTATTATAATAATGCTGCTGCTTTCGTT 180
Db     121 CCTGCTAACTGTGTGAACTGTCAGAAGAACTTCTACTACAACAACGCTGCTGCTTTCGTG 180

Qy     181 CCTGGTGCTAGTACGTGTACACCTTGTCCATAAAAAAAAGATGCTGGTGCTTAACCAAAT 240
Db     181 CCTGGAGCTTCTACCTGTACCCCTTGTCCTCAGAAGAAGGACGCTGGAGCTCAGCCTAAC 240

Qy     241 CCACCTGCTACTGCTAATTTAGTCACATAATGTAACGTTAAATGCCCTGCTGGTACCGCA 300
Db     241 CCTCCTGCTACCGCTAACCTGGTGACCCAGTGTAACGTGAAGTGTCCTGCTGGAACCGCT 300

Qy     301 ATTGCAGGTGGAGCAACAGATTATGCAGCAATAATCACAGAATGTGTTAATTGTAGAATT 360
Db     301 ATCGCTGGAGGAGCTACCGACTACGCTGCTATCATCACCGAGTGTGTGAACTGTCGCATC 360

Qy     361 AATTTTTATAATGAAAATGCTCCAAATTTTAATGCAGGTGCTAGTACATGCACAGCTTGT 420
Db     361 AACTTCTACAACGAGAACGCTCCTAACTTCAACGCTGGAGCTTCTACCTGTACCGCTTGT 420

Qy     421 CCGGTAAACAGAGTTGGTGGTGCATTGACTGCTGGTAATGCCGCTACCATAGTCGCATAA 480
Db     421 CCTGTGAACCGTGTGGGAGGAGCTCTGACCGCTGGAAACGCTGCTACCATCGTGGCTCAG 480

Qy     481 TGTAACGTCGCATGTCCTACTGGTACTGCACTTGATGATGGAGTAACTACTGATTATGTT 540
Db     481 TGTAACGTGGCTTGTCCTACCGGAACCGCTCTGGACGACGGAGTGACCACCGACTACGTG 540

Qy     541 AGATCATTCACAGAATGTGTTAAATGTAGACTTAACTTTTACTATAATGGTAATAATGGT 600
Db     541 CGCTCTTTCACCGAGTGTGTGAAGTGTCGCCTGAACTTCTACTACAACGGAAACAACGGA 600

Qy     601 AATACTCCTTTCAATCCAGGTAAAAGTTAATGCACACCTTGTCCGGCAATTAAACCTGCT 660
Db     601 AACACCCCTTTCAACCCTGGAAAGTCTCAGTGTACCCCTTGTCCTGCTATCAAGCCTGCT 660

Qy     661 AATGTTGCTTAAGCTACTTTAGGTAATGATGCTACAATAACCGCATAATGTAACGTTGCA 720
Db     661 AACGTGGCTCAGGCTACCCTGGGAAACGACGCTACCATCACCGCTCAGTGTAACGTGGCT 720

Qy     721 TGCCCTGATGGTACTATAAGTGCTGCTGGAGTAAATAATTGGGTAGCACAAAACACTGAA 780
Db     721 TGTCCTGACGGAACCATCTCTGCTGCTGGAGTGAACAACTGGGTGGCTCAGAACACCGAG 780

Qy     781 TGTACTAATTGTGCTCCTAACTTTTACAATAATAATGCTCCTAATTTCAATCCAGGTAAT 840
Db     781 TGTACCAACTGTGCTCCTAACTTCTACAACAACAACGCTCCTAACTTCAACCCTGGAAAC 840

Qy     841 AGTACATGCCTACCTTGCCCAGCAAATAAAGATTATGGTGCTGAAGCCACTGCAGGTGGT 900
Db     841 TCTACCTGTCTGCCTTGTCCTGCTAACAAGGACTACGGAGCTGAGGCTACCGCTGGAGGA 900

Qy     901 GCCGCTACTTTAGCCAAATAATGTAATATTGCATGCCCTGATGGTACTGCAATTGCTAGT 960
Db     901 GCTGCTACCCTGGCTAAGCAGTGTAACATCGCTTGTCCTGACGGAACCGCTATCGCTTCT 960

Qy     961 GGAGCAACTAATTATGTAATATTATAAACAGAATGTCTAAATTGTGCTGCTAACTTTTAT 1020
Db     961 GGAGCTACCAACTACGTGATCCTGCAGACCGAGTGTCTGAACTGTGCTGCTAACTTCTAC 1020

Qy    1021 TTTGATGGTAATAATTTCTAGGCAGGAAGTAGTAGATGCAAAGCATGTCCAGCAAATAAA 1080
Db    1021 TTCGACGGAAACAACTTCCAGGCTGGATCTTCTCGCTGTAAGGCTTGTCCTGCTAACAAG 1080

Qy    1081 GTTTAAGGCGCTGTAGCAACTGCAGGTGGTACTGCTACTTTAATTGCATAATGTGCCCTT 1140
Db    1081 GTGCAGGGAGCTGTGGCTACCGCTGGAGGAACCGCTACCCTGATCGCTCAGTGTGCTCTG 1140

Qy    1141 GAATGCCCTGCTGGTACTGTACTCACCGATGGAACAACATCTACTTATAAATAAGCAGCA 1200
Db    1141 GAGTGTCCTGCTGGAACCGTGCTGACCGACGGAACCACCTCTACCTACAAGCAGGCTGCT 1200

Qy    1201 TCTGAATGTGTTAAATGTGCTGCCAACTTTTATACTACAAAATAAACTGATTGGGTAGCA 1260
Db    1201 TCTGAGTGTGTGAAGTGTGCTGCTAACTTCTACACCACCAAGCAGACCGACTGGGTGGCT 1260

Qy    1261 GGTATTGATACATGTACTAGTTGTAATAAAAAATTAACTTCTGGCGCTGAAGCTAATTTA 1320
Db    1261 GGAATCGACACCTGTACCTCTTGTAACAAGAAGCTGACCTCTGGAGCTGAGGCTAACCTG 1320

Qy    1321 CCTGAATCTGCTAAAAAAAATATATAATGTGATTTCGCTAATTTTTTATCAATTTCCTTA 1380
Db    1321 CCTGAGTCTGCTAAGAAGAACATCCAGTGTGACTTCGCTAACTTCCTGTCTATCTCTCTG 1380

Qy    1381 TTATTGATTTCTTATTA 1397
Db    1381 CTGCTGATCTCTTACTA 1397


RESULT 7
AAA97037
ID   AAA97037 standard; DNA; 2486 BP.
XX
AC   AAA97037;
XX
DT   18-DEC-2000  (first entry)
XX
DE   Nucleotide sequence encoding 48kD i-antigen.
XX
KW   Immobilisation antigen; i-antigen; ichthyophthiriasis; vaccine; ds;
KW   white spot disease; freshwater fish; immune response; infection control.
XX
OS   Ichthyophthirius multifiliis.
XX
PN   WO200046373-A1.
XX
PD   10-AUG-2000.
XX
PF   04-FEB-2000; 2000WO-US02962.
XX
PR   04-FEB-1999;   99US-0118634.
PR   02-MAR-1999;   99US-0122372.
PR   17-MAR-1999;   99US-0124905.
PR   27-APR-1999;   99US-0131121.
XX
PA   (UYGE-) UNIV GEORGIA RES FOUND INC.
PA   (CORR ) CORNELL RES FOUND INC.
PA   (CLAR/) CLARK T G.
PA   (DICK/) DICKERSON H W.
PA   (LINT/) LIN T.
XX
PI   Clark TG,  Dickerson HW,  Lin T;
XX
DR   WPI; 2000-506071/45.
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XX
PT   Novel i-antigen polypeptides and polynucleotides from Ichthyophthirius
PT   multifiliis, useful for prophylaxis and treatment of Ichthyophthirius
PT   infection in fish -
XX
PS   Disclosure; Figure 1; 144pp; English.
XX
CC   This invention relates to novel i-antigen polypeptide sequences.
CC   I-antigens or immobilisation antigens ar common to a variety of
CC   hymenostomatid ciliates and their expression varies in response to
CC   environmental stimuli. This invention relates to i-antigens in
CC   Ichthyophthirius multifiliis, a protozoan which is an obligate parasite
CC   of freshwater fish causing ichthyophthiriasis or white spot disease. The
CC   invention includes two polypeptide and polynucleotide sequences for two
CC   i-antigens, of 48 and 55 kD. Also included in the invention are
CC   antibodies capable of binding to the nucleotide sequences and a method
CC   for identifying I. multifiliis serotypes using the nucleotide sequences.
CC   A composition (containing the i-antigen nucleotide) capable of eliciting
CC   an immune response in fish is useful for prophylaxis, treatment or for
CC   controlling I. multifiliis infection in fish. Polynucleotide or protein
CC   vaccines comprising a portion of the amplified product encoding an
CC   antigenic i-antigen polypeptide obtained is also useful for treating or
CC   preventing I. multifiliis infection in fish. Sequences AAA97036-A97042,
CC   and AAA97060, AAA97065 and AAA97089 represent i-antigen genes and gene
CC   fragments identified in the invention. Sequences AAA97043-A97064
CC   (excluding AAA97060) and AAA97071-A97088 represent primers used in the
CC   isolation of the i-antigen gene sequences. Sequences AAB25859-B25889 and
CC   AAB25893-B25906 represent i-antigen protein and peptide sequences.
XX
SQ   Sequence 2486 BP; 896 A; 310 C; 321 G; 959 T; 0 other;

  Query Match             18.3%;  Score 258;  DB 21;  Length 2486;
  Best Local Similarity   56.8%;  Pred. No. 3.5e-47;
  Matches  666;  Conservative    0;  Mismatches  395;  Indels  111;  Gaps    6;

Qy     344 GTGTTAATTGTAGAATTAATTTTTATAATGAAAATGCTCCAAATTTTAATGCAGGTGCTA 403
           ||| |  ||   ||     |  |  |||| ||  |    ||    |||||| | |
Db     599 GTGCTGCTTAAGGAGAAGCTAATGGTAATTAACCTTTCGCAGCAAATAATGCTGCTAGAG 658

Qy     404 GTACATGCACAGCTTGTCCGGTAAACAGAGTTGGTGGTGCATTGACTGCTGGTAATGCCG 463
           ||| |||   | | || |   ||||||||||| ||   ||     | ||| ||| |    |
Db     659 GTATATGTGTACCATGCCAAATAAACAGAGTAGGCTCTGTTACCAATGCAGGTGACTTAG 718

Qy     464 CTACCATAGTCGCATAATGTAACGTCGCATGTCCTACTGGTACTGCACTTGATGATGGAG 523
           ||||  ||| | |||||||  |       ||||||||||||| ||||||||||||||||||
Db     719 CTACTTTAGCCACATAATGCAGTACTTAATGTCCTACTGGCACTGCACTTGATGATGGAG 778

Qy     524 TAACTACTGATTATGTTAGATCATTCACAGAATGTGTTAAATGTAGACTTAACTTTTACT 583
           | ||   || || || |||||||  | || ||||||||||||| | || ||||||||||
Db     779 TGACAGATGTTTTTGATAGATCAGCCGCATAATGTGTTAAATGCAAACCTAACTTTTACT 838

Qy     584 ATAATGGTAATAATGGTAATACTCCTTTCAATCCAGGTAAAAGTTAATGCACACCTTGTC 643
           ||||||||  |  |  | |   |        |   | | ||  ||      |   |  |
Db     839 ATAATGGTGGTTCTCCTTAAGGTGAAGCTCCTGGCGTTTAAGTTTTTGCTGCTGGTGCTG 898

Qy     644 CGGCAATTAAACCTGCT----------------------------------------AATG 664
           | ||         ||||                                          || |
Db     899 CCGCTGCAGGTGTTGCTGCCGTTACTAGTTAATGTGTACCTTGCCAACTAAACAAAAACG 958

Qy     665 TTGCTTAAGCTACTTTAGGTAATGATGCTACAATAACCGCATAATGTAACGTTGCATGCC 724
           | ||   || |||  ||||    | ||||   || || |||||||||  |  |  ||| |
Db     959 ATTCTCCTGCCACTGCAGGTGCCTAAGCTAATTTAGCCACATAATGTAGCAATTAATGTC 1018

Qy     725 CTGATGGTACTATAAGTGCTGCTGGAGT---AAATAATTGGGTAGCACAAAACACTGAAT 781
           ||  ||| ||| ||  || || ||||||   |  |  ||     ||  |  |||   ||
Db    1019 CTACTGGCACTGTACTTGATGATGGAGTGACACTTGTTTTTAATACATCAGCCACATTAT 1078

Qy     782 GTACTAATTGTGCTCCTAACTTTTACAATAATAATGCTCCTAATT-------------- 826
           ||  ||| ||    ||||||||||||| |||||  || | ||  ||
Db    1079 GTGTTAAATGCAGACCTAACTTTTACTATAATGGTGGTTCTCCTTAAGGTGAAGCTCCTG 1138

Qy     827 ------------------------------------TCAATCCAGGTAATAGTACAT 847
                                                 |   | | | || ||||  ||

Db    1139 GCGTTTAAGTTTTTGCTGCTGGTGCTGCCGCTGCAGGTGTTGCTGCCGTTACTAGTTAAT 1198

Qy     848 GCCTACCTTGCCCAGCAAATAAAGATTATGGTGCTGAAGCCACTGCAGGTGGTGCCGCTA 907
           |  |||||||||  |  |||  |||  |  ||  |  ||   ||||||||||||     ||||
Db    1199 GTGTACCTTGCCAAATAAACAAAAACGATTCTCCT---GCCACTGCAGGTGCCTAAGCTA 1255

Qy     908 CTTTAGCCAAATAATGTAATATTGCATGCCCTGATGGTACTGCAATTGCTAGTGGAGCAA 967
           ||||||||  ||||||  |  ||  |   |||  ||   |||  |||||||||      ||||  |
Db    1256 ATTTAGCCACATAATGCAGTACTTAATGTCCAACTGGCACTGCAATTCAAGACGGAGTGA 1315

Qy     968 CTAATTATGTAATATTATAAACAGAATGTCTAAATTGTGCTGCTAACTTTTATTTTGATG 1027
           |   |  | | |      | | |   ||        ||        |     |||  |||  |
Db    1316 CACTTGTTTTTAGTAATTCATCCACATAATGTTCTTAATGCATTGCTAATTACTTTTTTA 1375

Qy    1028 GTAATAATTTCTAGGCAGGAAGTAGTAGATGCAAAGCATGTCCAGCAAATAAAGTTTAAG 1087
           |  |||||||  | |||||  |  |||  |||    |   |||||||  || ||||  |
Db    1376 ATGGTAATTTCGAAGCAGGTAAAAGTTAATGTTTAAAGTGTCCAGTAAGTAAAACT---A 1432

Qy    1088 GCGCTGTAGCAACTGCAGGTGGTACTGCTACTTTAATTGCATAATGTGCCCTTGAATGCC 1147
           |  | |    ||  |||||  ||||||||||| |    ||||||||        ||| |
Db    1433 CTCCAGCACATGCTCCAGGTAATACTGCTACTTAAGCCACATAATGTTTGACCACATGTC 1492

Qy    1148 CTGCTGGTACTGTACTCACCGATGGAACAACATCTACTTATAAATAAGCAGCATCTGAAT 1207
           ||||||||||  |||||    |||||||||  || ||| || |  |    | ||| ||||||
Db    1493 CTGCTGGTACAGTACTTGATGATGGAACATCAACTAATTTTGTAGCTTCCGCAACTGAAT 1552

Qy    1208 GTGTTAAATGTGCTGCCAACTTTTATACTACAAAATAAACTGATTGGGTAGCAGGTATTG 1267
           ||  |||||| ||||   |||||  | |  |||||  |||||  ||    ||||||||  ||
Db    1553 GTACTAAATGTTCTGCTGGCTTTTTTGCATCAAAAACAACTGGTTTTACAGCAGGTACTG 1612

Qy    1268 ATACATGTACTAGTTGTAATAAAAAATTAACTTCTGGCGCTGAAGCTAATTTACCTGAAT 1327
           ||||||||||   |||| ||||||||||||||||||  ||   ||||||  ||  ||
Db    1613 ATACATGTACTGAATGTACTAAAAAATTAACTTCTGGTGCCACAGCTAAAGTATATGCTG 1672

Qy    1328 CTGCTAAAAAAAAATATATAATG---------TGATTTCGCTAATTTTTTATCAATTTCCT 1378
           ||||   ||||  |||||||          |  |||||||| ||||||| |||||||
Db    1673 AAGCTACTCAAAAAGTATAATGCGCCTCCACTACTTTCGCTAAATTTTTATCGATTTCCT 1732

Qy    1379 TATTATTGATTTCTTATTATTTATTATGATGA 1410
           |||||||  |||||||  ||||||||  ||||||
Db    1733 TATTATTTATTTCTTTCTATTTATTGTGATGA 1764


RESULT 8
AAA52134
ID   AAA52134 standard; DNA; 2811 BP.
XX
AC   AAA52134;
XX
DT   04-DEC-2000  (first entry)
XX
DE   pBICH3 construct containing 48 kDa i-antigen gene.
XX
KW   BTU1; beta-tubulin; protein expression system; negative selection;
KW   paclitaxel sensitivity; cell surface; antigen; protozoa; ciliate;
KW   live vaccine; Ichthyophthiius multifiliis; immobilization-antigen;
KW   i-antigen; freshwater; fish; protozoacide; pBICH3; ds.
XX
OS   Chimeric - Tetrahymena thermophila.
OS   Chimeric - Ichthyophthiius multifiliis.
XX
FH   Key             Location/Qualifiers
FT   CDS             988..2325
FT                   /*tag= a
FT                   /product= 48_kDa_i-antigen
FT                   /transl_except= (pos:1078..1080, aa:Gln)
FT                   /codon= (seq:"TAA", aa:Gln)
FT   misc_feature    991..999
FT                   /*tag= b
FT                   /note= "Cloning residual from parent construct HHF1::neo"
XX
PN   WO200046381-A1.
XX
```

PD 10-AUG-2000.
XX
PF 04-FEB-2000; 2000WO-US02966.
XX
PR 04-FEB-1999; 99US-0118634.
PR 02-MAR-1999; 99US-0122372.
PR 17-MAR-1999; 99US-0124905.
PR 27-APR-1999; 99US-0131121.
XX
PA (UYGE-) UNIV GEORGIA RES FOUND INC.
PA (GAER/) GAERTIG J.
PA (DICK/) DICKERSON H W.
PA (CLAR/) CLARK T G.
XX
PI Gaertig J, Dickerson HW, Clark TG;
XX
DR WPI; 2000-514962/46.
DR P-PSDB; AAY97176.
XX
PT Recombinant expression systems for expressing heterologous nucleic
PT acids and producing recombinant protein, comprises nonpathogenic
PT protozoa such as Tetrahymena resistant to paclitaxel
XX
PS Example 1; Fig 2B; 83pp; English.
XX
CC Tetrahymena thermophila expresses two major beta-tubulin genes (BTU1 and
CC BTU2), which encode identical beta-tubulin proteins. Either of these two
CC genes (but not both at once) can be disrupted without a detectable change
CC in the cell phenotype. A K350L substitution in the BTU1 beta-tubulin
CC protein confers increased resistance to microtubule-depolymerizing drugs
CC and increased sensitivity to paclitaxel, a microtubule-stabilizing drug.
CC Cells carrying the Btu1-1K350M allele can be transformed to paclitaxel
CC resistance by gene replacement of Btu1-1K350M with a wild-type BTU1 gene
CC fragment, eliminating the need to incorporate a means for positive
CC selection. Where the host organism is not a T. thermophila mutant
CC containing the Btu1-1K350M allele, BTU1::neo1 construct, which
CC substitutes the coding region of the neo1 gene (conferring resistance to
CC parmomycin) for that of BTU1, can be used to generate BTU1 gene knockouts
CC and for positive selection. Heterologous nucleic acids (especially
CC encoding antigenic polypeptides) can be inserted into a BTU gene for
CC successful cell-surface expression that is maintained by way of negative
CC selection. Preferred expression vectors disrupt the Btu1-1K350M gene by
CC homologous recombination-mediated insertion of a heterologous nucleic
CC acid, thereby restoring resistance to paclitaxel in the resulting
CC transgenic host. Transgenic ciliated protozoa are useful as live vaccines
CC for stimulating an immune response in a vertebrate. The transgenic
CC protozoan host cells are also useful for producing polyclonal antibodies
CC (claimed). In particular, Tetrahymena expressing Ichthyophthiius
CC multifiliis immobilization-antigen (i-antigen) protein on their surface
CC are effective vehicles for vaccination of freshwater fish against
CC infection by I. multifiliis.
XX
SQ Sequence 2811 BP; 957 A; 438 C; 434 G; 982 T; 0 other;

Query Match 18.1%; Score 254.8; DB 21; Length 2811;
Best Local Similarity 56.7%; Pred. No. 1.8e-46;
Matches 664; Conservative 0; Mismatches 397; Indels 111; Gaps 6;

```
Qy    344 GTGTTAATTGTAGAATTAATTTTTATAATGAAAATGCTCCAAATTTTAATGCAGGTGCTA 403
Db   1163 GTGCTGCTTAAGGAGAAGCTAATGGTAATTAACCTTTCGCAGCAAATAATGCTGCTAGAG 1222

Qy    404 GTACATGCACAGCTTGTCCGGTAAACAGAGTTGGTGGTGCATTGACTGCTGGTAATGCCG 463
Db   1223 GTATATGTGTACCATGCCAAATAAACAGAGTAGGCTCTGTTACCAATGCAGGTGACTTAG 1282

Qy    464 CTACCATAGTCGCATAATGTAACGTCGCATGTCCTACTGGTACTGCACTTGATGATGGAG 523
Db   1283 CTACTTTAGCCACATAATGCAGTACTTAATGTCCTACTGGCACTGCACTTGATGATGGAG 1342

Qy    524 TAACTACTGATTATGTTAGATCATTCACAGAATGTGTTAAATGTAGACTTAACTTTTACT 583
Db   1343 TGACAGATGTTTTTGATAGATCAGCCGCATAATGTGTTAAATGCAAACCTAACTTTTACT 1402

Qy    584 ATAATGGTAATAATGGTAATACTCCTTTCAATCCAGGTAAAAGTTAATGCACACCTTGTC 643
Db   1403 ATAATGGTGGTTCTCCTTAAGGTGAAGCTCCTGGCGTTTAAGTTTTTGCTGCTGGTGCTG 1462

Qy    644 CGGCAATTAAACCTGCT----------------------------------------AATG 664
Db   1463 CCGCTGCAGGTGTTGCTGCCGTTACTAGTTAATGTGTACCTTGCCAACTAAACAAAAACG 1522

Qy    665 TTGCTTAAGCTACTTTAGGTAATGATGCTACAATAACCGCATAATGTAACGTTGCATGCC 724
Db   1523 ATTCTCCTGCCACTGCAGGTGCCTAAGCTAATTTAGCCACATAATGTAGCAATTAATGTC 1582

Qy    725 CTGATGGTACTATAAGTGCTGCTGGAGT---AAATAATTGGGTAGCACAAAACACTGAAT 781
Db   1583 CTACTGGCACTGTACTTGATGATGGAGTGACACTTGTTTTTAATACATCAGCCACATTAT 1642

Qy    782 GTACTAATTGTGCTCCTAACTTTTACAATAATAATGCTCCTAATT--------------- 826
Db   1643 GTGTTAAATGCAGACCTAACTTTTACTATAATGGTGGTTCTCCTTAAGGTGAAGCTCCTG 1702

Qy    827 ----------------------------------------TCAATCCAGGTAATAGTACAT 847
Db   1703 GCGTTTAAGTTTTTGCTGCTGGTGCTGCCGCTGCAGGTGTTGCTGCCGTTACTAGTTAAT 1762

Qy    848 GCCTACCTTGCCCAGCAAATAAAGATTATGGTGCTGAAGCCACTGCAGGTGGTGCCGCTA 907
Db   1763 GTGTACCTTGCCAAATAAACAAAAACGATTCTCCT---GCCTCTGCAGGTGCCTAAGCTA 1819

Qy    908 CTTTAGCCAAATAATGTAATATTGCATGCCCTGATGGTACTGCAATTGCTAGTGGAGCAA 967
Db   1820 ATTTAGCCACATAATGCAGTACTTAATGTCCAACTGGCACTGCAATTCAAGACGGAGTGA 1879

Qy    968 CTAATTATGTAATATTATAAACAGAATGTCTAAATTGTGCTGCTAACTTTTATTTTGATG 1027
Db   1880 CACTTGTTTTTAGTAATTCATCCACATAATGTTCTTAATGCATTGCTAATTACTTTTTTA 1939

Qy   1028 GTAATAATTTCTAGGCAGGAAGTAGTAGATGCAAAGCATGTCCAGCAAATAAAGTTTAAG 1087
Db   1940 ATGGTAATTTCGAAGCAGGTAAAAGTTAATGTTTAAAGTGTCCAGTAAGTAAAACT---A 1996

Qy   1088 GCGCTGTAGCAACTGCAGGTGGTACTGCTACTTTAATTGCATAATGTGCCCTTGAATGCC 1147
Db   1997 CTCCAGCACATGCTCCAGGTAATACTGCTACTTAAGCCACATAATGTTTGACCACATGTC 2056

Qy   1148 CTGCTGGTACTGTACTCACCGATGGAACAACATCTACTTATAAATAAGCAGCATCTGAAT 1207
Db   2057 CTGCTGGTACAGTACTTGATGATGGAACATCAACTAATTTTGTAGCTTCCGCAACTGAAT 2116

Qy   1208 GTGTTAAATGTGCTGCCAACTTTTATACTACAAAATAAACTGATTGGGTAGCAGGTATTG 1267
Db   2117 GTACTAAATGTTCTGCTGGCTTTTTTGCATCAAAAACAACTGGTTTTACAGCAGGTACTG 2176

Qy   1268 ATACATGTACTAGTTGTAATAAAAAATTAACTTCTGGCGCTGAAGCTAATTTACCTGAAT 1327
Db   2177 ATACATGTACTGAATGTACTAAAAAATTAACTTCTGGTGCCACAGCTAAAGTATATGCTG 2236

Qy   1328 CTGCTAAAAAAAATATATAATG---------TGATTTCGCTAATTTTTTATCAATTTCCT 1378
Db   2237 AAGCTACTCAAAAAGTATAATGCGCCTCCACTACTTTCGCTAAATTTTTATCGATTTCCT 2296

Qy   1379 TATTATTGATTTCTTATTATTTATTATGATGA 1410
Db   2297 TATTATTTATTTCTTTCTATTTATTGTGAGGA 2328
```

RESULT 9
AAA97036
ID AAA97036 standard; DNA; 1326 BP.
XX
AC AAA97036;
XX
DT 18-DEC-2000 (first entry)

XX
DE 48kD i-antigen nucleotide sequence.
XX
KW Immobilisation antigen; i-antigen; ichthyophthiriasis; vaccine; ds;
KW white spot disease; freshwater fish; immune response; infection control.
XX
OS Ichthyophthirius multifiliis.
XX
PN WO200046373-A1.
XX
PD 10-AUG-2000.
XX
PF 04-FEB-2000; 2000WO-US02962.
XX
PR 04-FEB-1999; 99US-0118634.
PR 02-MAR-1999; 99US-0122372.
PR 17-MAR-1999; 99US-0124905.
PR 27-APR-1999; 99US-0131121.
XX
PA (UYGE-) UNIV GEORGIA RES FOUND INC.
PA (CORR) CORNELL RES FOUND INC.
PA (CLAR/) CLARK T G.
PA (DICK/) DICKERSON H W.
PA (LINT/) LIN T.
XX
PI Clark TG, Dickerson HW, Lin T;
XX
DR WPI; 2000-506071/45.
XX
PT Novel i-antigen polypeptides and polynucleotides from Ichthyophthirius
PT multifiliis, useful for prophylaxis and treatment of Ichthyophthirius
PT infection in fish -
XX
PS Claim 2; Figure 3; 144pp; English.
XX
CC This invention relates to novel i-antigen polypeptide sequences.
CC I-antigens or immobilisation antigens ar common to a variety of
CC hymenostomatid ciliates and their expression varies in response to
CC environmental stimuli. This invention relates to i-antigens in
CC Ichthyophthirius multifiliis, a protozoan which is an obligate parasite
CC of freshwater fish causing ichthyophthiriasis or white spot disease. The
CC invention includes two polypeptide and polynucleotide sequences for two
CC i-antigens, of 48 and 55 kD. Also included in the invention are
CC antibodies capable of binding to the nucleotide sequences and a method
CC for identifying I. multifiliis serotypes using the nucleotide sequences.
CC A composition (containing the i-antigen nucleotide) capable of eliciting
CC an immune response in fish is useful for prophylaxis, treatment or for
CC controlling I. multifiliis infection in fish. Polynucleotide or protein
CC vaccines comprising a portion of the amplified product encoding an
CC antigenic i-antigen polypeptide obtained is also useful for treating or
CC preventing I. multifiliis infection in fish. Sequences AAA97036-A97042,
CC and AAA97060, AAA97065 and AAA97089 represent i-antigen genes and gene
CC fragments identified in the invention. Sequences AAA97043-A97064
CC (excluding AAA97060) and AAA97071-A97088 represent primers used in the
CC isolation of the i-antigen gene sequences. Sequences AAB25859-B25889 and
CC AAB25893-B25906 represent i-antigen protein and peptide sequences.
XX
SQ Sequence 1326 BP; 371 A; 251 C; 253 G; 451 T; 0 other;

Query Match 17.9%; Score 252.6; DB 21; Length 1326;
Best Local Similarity 56.7%; Pred. No. 4.5e-46;
Matches 660; Conservative 0; Mismatches 394; Indels 111; Gaps 6;

```
Qy    344 GTGTTAATTGTAGAATTAATTTTTATAATGAAAATGCTCCAAATTTTAATGCAGGTGCTA 403
Db    167 GTGCTGCTTAAGGAGAAGCTAATGGTAATTAACCTTTCGCAGCAAATAATGCTGCTAGAG 226

Qy    404 GTACATGCACAGCTTGTCCGGTAAACAGAGTTGGTGGTGCATTGACTGCTGGTAATGCCG 463
Db    227 GTATATGTGTACCATGCCAAATAAACAGAGTAGGCTCTGTTACCAATGCAGGTGACTTAG 286

Qy    464 CTACCATAGTCGCATAATGTAACGTCGCATGTCCTACTGGTACTGCACTTGATGATGGAG 523
Db    287 CTACTTTAGCCACATAATGCAGTACTTAATGTCCTACTGGCACTGCACTTGATGATGGAG 346

Qy    524 TAACTACTGATTATGTTAGATCATTCACAGAATGTGTTAAATGTAGACTTAACTTTTACT 583
Db    347 TGACAGATGTTTTTGATAGATCAGCCGCATAATGTGTTAAATGCAAACCTAACTTTTACT 406

Qy    584 ATAATGGTAATAATGGTAATACTCCTTTCAATCCAGGTAAAAGTTAATGCACACCTTGTC 643
Db    407 ATAATGGTGGTTCTCCTTAAGGTGAAGCTCCTGGCGTTTAAGTTTTTGCTGCTGGTGCTG 466

Qy    644 CGGCAATTAAACCTGCT----------------------------------------AATG 664
Db    467 CCGCTGCAGGTGTTGCTGCCGTTACTAGTTAATGTGTACCTTGCCAACTAAACAAAAACG 526

Qy    665 TTGCTTAAGCTACTTTAGGTAATGATGCTACAATAACCGCATAATGTAACGTTGCATGCC 724
Db    527 ATTCTCCTGCCACTGCAGGTGCCTAAGCTAATTTAGCCACATAATGTAGCAATTAATGTC 586

Qy    725 CTGATGGTACTATAAGTGCTGCTGGAGT---AAATAATTGGGTAGCACAAAACACTGAAT 781
Db    587 CTACTGGCACTGTACTTGATGATGGAGTGACACTTGTTTTTAATACATCAGCCACATTAT 646

Qy    782 GTACTAATTGTGCTCCTAACTTTTACAATAATAATGCTCCTAATT-------------- 826
Db    647 GTGTTAAATGCAGACCTAACTTTTACTATAATGGTGGTTCTCCTTAAGGTGAAGCTCCTG 706

Qy    827 ----------------------------------------TCAATCCAGGTAATAGTACAT 847
Db    707 GCGTTTAAGTTTTTGCTGCTGGTGCTGCCGCTGCAGGTGTTGCTGCCGTTACTAGTTAAT 766

Qy    848 GCCTACCTTGCCCAGCAAATAAAGATTATGGTGCTGAAGCCACTGCAGGTGGTGCCGCTA 907
Db    767 GTGTACCTTGCCAAATAAACAAAAACGATTCTCCT---GCCACTGCAGGTGCCTAAGCTA 823

Qy    908 CTTTAGCCAAATAATGTAATATTGCATGCCCTGATGGTACTGCAATTGCTAGTGGAGCAA 967
Db    824 ATTTAGCCACATAATGCAGTACTTAATGTCCAACTGGCACTGCAATTCAAGACGGAGTGA 883

Qy    968 CTAATTATGTAATATTATAAACAGAATGTCTAAATTGTGCTGCTAACTTTTATTTTGATG 1027
Db    884 CACTTGTTTTTAGTAATTCATCCACATAATGTTCTTAATGCATTGCTAATTACTTTTTTA 943

Qy   1028 GTAATAATTTCTAGGCAGGAAGTAGTAGATGCAAAGCATGTCCAGCAAATAAAGTTTAAG 1087
Db    944 ATGGTAATTTCGAAGCAGGTAAAAGTTAATGTTTAAAGTGTCCAGTAAGTAAAACT---A 1000

Qy   1088 GCGCTGTAGCAACTGCAGGTGGTACTGCTACTTTAATTGCATAATGTGCCCTTGAATGCC 1147
Db   1001 CTCCAGCACATGCTCCAGGTAATACTGCTACTTAAGCCACATAATGTTTGACCACATGTC 1060

Qy   1148 CTGCTGGTACTGTACTCACCGATGGAACAACATCTACTTATAAATAAGCAGCATCTGAAT 1207
Db   1061 CTGCTGGTACAGTACTTGATGATGGAACATCAACTAATTTTGTAGCTTCCGCAACTGAAT 1120

Qy   1208 GTGTTAAATGTGCTGCCAACTTTTATACTACAAAATAAACTGATTGGGTAGCAGGTATTG 1267
Db   1121 GTACTAAATGTTCTGCTGGCTTTTTTGCATCAAAAACAACTGGTTTTACAGCAGGTACTG 1180

Qy   1268 ATACATGTACTAGTTGTAATAAAAAATTAACTTCTGGCGCTGAAGCTAATTTACCTGAAT 1327
Db   1181 ATACATGTACTGAATGTACTAAAAAATTAACTTCTGGTGCCACAGCTAAAGTATATGCTG 1240

Qy   1328 CTGCTAAAAAAAATATATAATG---------TGATTTCGCTAATTTTTTATCAATTTCCT 1378
Db   1241 AAGCTACTCAAAAAGTATAATGCGCCTCCACTACTTTCGCTAAATTTTTATCGATTTCCT 1300

Qy   1379 TATTATTGATTTCTTATTATTTATT 1403
Db   1301 TATTATTTATTTCTTTCTATTTATT 1325
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RESULT 10
AAA52135

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ID   AAA52135 standard; DNA; 1326 BP.
XX
AC   AAA52135;
XX
DT   04-DEC-2000  (first entry)
XX
DE   48 kDa i-antigen gene.
XX
KW   BTU1; beta-tubulin; protein expression system; negative selection;
KW   paclitaxel sensitivity; cell surface; antigen; protozoa; ciliate;
KW   live vaccine; Ichthyophthiius multifiliis; immobilization-antigen;
KW   i-antigen; freshwater; fish; protozoacide; ds.
XX
OS   Ichthyophthiius multifiliis.
XX
FH   Key             Location/Qualifiers
FT   CDS             1..1326
FT                   /*tag=  a
FT                   /transl_except= "pos:82..84, aa:Gln"
FT                   /codon= (seq:"TAA", aa:Gln)
FT                   /product= 48_kDa_i-antigen
FT                   /partial
XX
PN   WO200046381-A1.
XX
PD   10-AUG-2000.,
XX
PF   04-FEB-2000; 2000WO-US02966.
XX
PR   04-FEB-1999;   99US-0118634.
PR   02-MAR-1999;   99US-0122372.
PR   17-MAR-1999;   99US-0124905.
PR   27-APR-1999;   99US-0131121.
XX
PA   (UYGE-) UNIV GEORGIA RES FOUND INC.
PA   (GAER/) GAERTIG J.
PA   (DICK/) DICKERSON H W.
PA   (CLAR/) CLARK T G.
XX
PI   Gaertig J,  Dickerson HW,  Clark TG;
XX
DR   WPI; 2000-514962/46.
DR   P-PSDB; AAY97176.
XX
PT   Recombinant expression systems for expressing heterologous nucleic
PT   acids and producing recombinant protein, comprises nonpathogenic
PT   protozoa such as Tetrahymena resistant to paclitaxel
XX
PS   Disclosure; Fig 3B; 83pp; English.
XX
CC   Tetrahymena thermophila expresses two major beta-tubulin genes (BTU1 and
CC   BTU2), which encode identical beta-tubulin proteins. Either of these two
CC   genes (but not both at once) can be disrupted without a detectable change
CC   in the cell phenotype. A K350L substitution in the BTU1 beta-tubulin
CC   protein confers increased resistance to microtubule-depolymerizing drugs
CC   and increased sensitivity to paclitaxel, a microtubule-stabilizing drug.
CC   Cells carrying the Btu1-1K350M allele can be transformed to paclitaxel
CC   resistance by gene replacement of Btu1-1K350M with a wild-type BTU1 gene
CC   fragment, eliminating the need to incorporate a means for positive
CC   selection. Where the host organism is not a T. thermophila mutant
CC   containing the Btu1-1K350M allele, BTU1::neo1 construct, which
CC   substitutes the coding region of the neo1 gene (conferring resistance to
CC   parmomycin) for that of BTU1, can be used to generate BTU1 gene knockouts
CC   and for positive selection. Heterologous nucleic acids (especially
CC   encoding antigenic polypeptides) can be inserted into a BTU gene for
CC   successful cell-surface expression that is maintained by way of negative
CC   selection. Preferred expression vectors disrupt the Btu1-1K350M gene by
CC   homologous recombination-mediated insertion of a heterologous nucleic
CC   acid, thereby restoring resistance to paclitaxel in the resulting
CC   transgenic host. Transgenic ciliated protozoa are useful as live vaccines
CC   for stimulating an immune response in a vertebrate. The transgenic
CC   protozoan host cells are also useful for producing polyclonal antibodies
CC   (claimed). In particular, Tetrahymena expressing Ichthyophthiius
CC   multifiliis immobilization-antigen (i-antigen) protein on their surface
CC   are effective vehicles for vaccination of freshwater fish against
CC   infection by I. multifiliis.
XX
SQ   Sequence 1326 BP; 371 A; 252 C; 252 G; 451 T; 0 other;
```

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  Query Match             17.8%;  Score 251;  DB 21;  Length 1326;
  Best Local Similarity   56.6%;  Pred. No. 1e-45;
  Matches  659;  Conservative    0;  Mismatches  395;  Indels  111;  Gaps    6;

Qy    344 GTGTTAATTGTAGAATTAATTTTTATAATGAAAATGCTCCAAATTTTAATGCAGGTGCTA 403
          ||| |  ||   ||     |  |  |||| ||  |    ||     |||||| | |
Db    167 GTGCTGCTTAAGGAGAAGCTAATGGTAATTAACCTTTCGCAGCAAATAATGCTGCTAGAG 226

Qy    404 GTACATGCACAGCTTGTCCGGTAAACAGAGTTGGTGGTGCATTGACTGCTGGTAATGCCG 463
          ||| |||   | | ||  |   ||||||||||  ||   ||     | ||| ||| |    |
Db    227 GTATATGTGTACCATGCCAAATAAACAGAGTAGGCTCTGTTACCAATGCAGGTGACTTAG 286

Qy    464 CTACCATAGTCGCATAATGTAACGTCGCATGTCCTACTGGTACTGCACTTGATGATGGAG 523
          ||||  ||| | |||||||  |       ||||||||||| ||||||||||||||||||
Db    287 CTACTTTAGCCACATAATGCAGTACTTAATGTCCTACTGGCACTGCACTTGATGATGGAG 346

Qy    524 TAACTACTGATTATGTTAGATCATTCACAGAATGTGTTAAATGTAGACTTAACTTTTACT 583
          | ||   || || || |||||||  | || |||||||||||||| | || ||||||||||
Db    347 TGACAGATGTTTTTGATAGATCAGCCGCATAATGTGTTAAATGCAAACCTAACTTTTACT 406

Qy    584 ATAATGGTAATAATGGTAATACTCCTTTCAATCCAGGTAAAAGTTAATGCACACCTTGTC 643
          ||||||||  |  |  | |   |         |   | | ||  ||      |  | |
Db    407 ATAATGGTGGTTCTCCTTAAGGTGAAGCTCCTGGCGTTTAAGTTTTTGCTGCTGGTGCTG 466

Qy    644 CGGCAATTAAACCTGCT----------------------------------------AATG 664
          | ||          ||||                                        || |
Db    467 CCGCTGCAGGTGTTGCTGCCGTTACTAGTTAATGTGTACCTTGCCAACTAAACAAAAACG 526

Qy    665 TTGCTTAAGCTACTTTAGGTAATGATGCTACAATAACCGCATAATGTAACGTTGCATGCC 724
            | ||   || |||  ||||    | ||||   || ||  |||||||||  |  |  ||| |
Db    527 ATTCTCCTGCCACTGCAGGTGCCTAAGCTAATTTAGCCACATAATGTAGCAATTAATGTC 586

Qy    725 CTGATGGTACTATAAGTGCTGCTGGAGT---AAATAATTGGGTAGCACAAAACACTGAAT 781
          ||  ||| ||| ||  ||  || ||||||   |  |  ||          ||  |  |||   ||
Db    587 CTACTGGCACTGTACTTGATGATGGAGTGACACTTGTTTTTAATACATCAGCCACATTAT 646

Qy    782 GTACTAATTGTGCTCCTAACTTTTACAATAATAATGCTCCTAATT--------------- 826
          ||  ||| ||    |||||||||||| |||||  || | ||  ||
Db    647 GTGTTAAATGCAGACCTAACTTTTACTATAATGGTGGTTCTCCTTAAGGTGAAGCTCCTG 706

Qy    827 -------------------------------------TCAATCCAGGTAATAGTACAT 847
                                                |   | | | || ||||  ||
Db    707 GCGTTTAAGTTTTTGCTGCTGGTGCTGCCGCTGCAGGTGTTGCTGCCGTTACTAGTTAAT 766

Qy    848 GCCTACCTTGCCCAGCAAATAAAGATTATGGTGCTGAAGCCACTGCAGGTGGTGCCGCTA 907
          |  |||||||| |  ||| ||| | ||  | ||   |||||||||||||     ||||
Db    767 GTGTACCTTGCCAAATAAACAAAAACGATTCTCCT---GCCACTGCAGGTGCCTAAGCTA 823

Qy    908 CTTTAGCCAAATAATGTAATATTGCATGCCCTGATGGTACTGCAATTGCTAGTGGAGCAA 967
           |||||||| ||||||  | || |  ||| ||   ||| |||||||||      ||||  |
Db    824 ATTTAGCCACATAATGCAGTACTTAATGTCCAACTGGCACTGCAATTCAAGACGGAGTGA 883

Qy    968 CTAATTATGTAATATTATAAACAGAATGTCTAAATTGTGCTGCTAACTTTTATTTTGATG 1027
          |   |  | | |     | | |  ||       ||       |    ||| |||  |
Db    884 CACTTGTTTTTAGTAATTCATCCACATAATGTTCTTAATGCATTGCTAATTACTTTTTTA 943

Qy   1028 GTAATAATTTCTAGGCAGGAAGTAGTAGATGCAAAGCATGTCCAGCAAATAAAGTTTAAG 1087
          |  ||||||| | ||||| |  |||  |||   |  |||||||| || ||||  |
Db    944 ATGGTAATTTCGAAGCAGGTAAAAGTTAATGTTTAAAGTGTCCAGTAAGTAAAACT---A 1000

Qy   1088 GCGCTGTAGCAACTGCAGGTGGTACTGCTACTTTAATTGCATAATGTGCCCTTGAATGCC 1147
            | | |   || |||||  |||||||||||| |    ||||||||         ||| |
Db   1001 CTCCAGCACATGCTCCAGGTAATACTGCTACTTAAGCCACATAATGTTTGACCACATGTC 1060

Qy   1148 CTGCTGGTACTGTACTCACCGATGGAACAACATCTACTTATAAATAAGCAGCATCTGAAT 1207
          ||||||||||| |||||    ||||||||| || ||| || |  |    | ||| ||||||
Db   1061 CTGCTGGTACAGTACTTGATGATGGAACATCAACTAATTTTGTAGCTTCCGCAACTGAAT 1120
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Qy   1208 GTGTTAAATGTGCTGCCAACTTTTATACTACAAAATAAACTGATTGGGTAGCAGGTATTG 1267
          ||  ||||||| ||||   ||||| | |  |||||  ||||| ||    | |||||| ||
Db   1121 GTACTAAATGTTCTGCTGGCTTTTTTGCATCAAAAACAACTGGTTTTACACCAGGTACTG 1180

Qy   1268 ATACATGTACTAGTTGTAATAAAAAATTAACTTCTGGCGCTGAAGCTAATTTACCTGAAT 1327
          ||||||||||||   |||| ||||||||||||||||||| ||   ||||||  ||  ||
Db   1181 ATACATGTACTGAATGTACTAAAAAATTAACTTCTGGTGCCACAGCTAAAGTATATGCTG 1240

Qy   1328 CTGCTAAAAAAAATATATAATG---------TGATTTCGCTAATTTTTTATCAATTTCCT 1378
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Db   1241 AAGCTACTCAAAAAGTATAATGCGCCTCCACTACTTTCGCTAAATTTTTATCGATTTCCT 1300

Qy   1379 TATTATTGATTTCTTATTATTTATT 1403
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Db   1301 TATTATTTATTTCTTTCTATTTATT 1325
```

RESULT 11
AAA97075
ID AAA97075 standard; DNA; 138 BP.
XX
AC AAA97075;
XX
DT 18-DEC-2000 (first entry)
XX
DE G5 synthetic gene synthesis primer 3205.
XX
KW Immobilisation antigen; i-antigen; ichthyophthiriasis; vaccine;
KW white spot disease; freshwater fish; immune response; infection control;
KW PCR primer; ss.
XX
OS Synthetic.
XX
PN WO200046373-A1.
XX
PD 10-AUG-2000.
XX
PF 04-FEB-2000; 2000WO-US02962.
XX
PR 04-FEB-1999; 99US-0118634.
PR 02-MAR-1999; 99US-0122372.
PR 17-MAR-1999; 99US-0124905.
PR 27-APR-1999; 99US-0131121.
XX
PA (UYGE-) UNIV GEORGIA RES FOUND INC.
PA (CORR) CORNELL RES FOUND INC.
PA (CLAR/) CLARK T G.
PA (DICK/) DICKERSON H W.
PA (LINT/) LIN T.
XX
PI Clark TG, Dickerson HW, Lin T;
XX
DR WPI; 2000-506071/45.
XX
PT Novel i-antigen polypeptides and polynucleotides from Ichthyophthirius
PT multifiliis, useful for prophylaxis and treatment of Ichthyophthirius
PT infection in fish -
XX
PS Disclosure; Figure 12; 144pp; English.
XX
CC This invention relates to novel i-antigen polypeptide sequences.
CC I-antigens or immobilisation antigens ar common to a variety of
CC hymenostomatid ciliates and their expression varies in response to
CC environmental stimuli. This invention relates to i-antigens in
CC Ichthyophthirius multifiliis, a protozoan which is an obligate parasite
CC of freshwater fish causing ichthyophthiriasis or white spot disease. The
CC invention includes two polypeptide and polynucleotide sequences for two
CC i-antigens, of 48 and 55 kD. Also included in the invention are
CC antibodies capable of binding to the nucleotide sequences and a method
CC for identifying I. multifiliis serotypes using the nucleotide sequences.
CC A composition (containing the i-antigen nucleotide) capable of eliciting
CC an immune response in fish is useful for prophylaxis, treatment or for
CC controlling I. multifiliis infection in fish. Polynucleotide or protein
CC vaccines comprising a portion of the amplified product encoding an
CC antigenic i-antigen polypeptide obtained is also useful for treating or
CC preventing I. multifiliis infection in fish. Sequences AAA97036-A97042,
CC and AAA97060, AAA97065 and AAA97089 represent i-antigen genes and gene
CC fragments identified in the invention. Sequences AAA97043-A97064
CC (excluding AAA97060) and AAA97071-A97088 represent primers used in the
CC isolation of the i-antigen gene sequences. Sequences AAB25859-B25889 and
CC AAB25893-B25906 represent i-antigen protein and peptide sequences.
XX
SQ Sequence 138 BP; 30 A; 43 C; 32 G; 33 T; 0 other;

```
  Query Match             5.2%;  Score 73;  DB 21;  Length 138;
  Best Local Similarity   70.8%;  Pred. No. 7.7e-07;
  Matches   97;  Conservative    0;  Mismatches   40;  Indels    0;  Gaps    0;

Qy    313 GCAACAGATTATGCAGCAATAATCACAGAATGTGTTAATTGTAGAATTAATTTTTATAAT 372
          || || || || || || || || ||||| || ||||| || ||| | || || || || ||
Db      1 GCTACCGACTACGCTGCTATCATCACCGAGTGTGTGAACTGTCGCATCAACTTCTACAAC 60

Qy    373 GAAAATGCTCCAAATTTTAATGCAGGTGCTAGTACATGCACAGCTTGTCCGGTAAACAGA 432
          || || ||||| || || || || || ||| ||| || || |||||||| || ||| |
Db     61 GAGAACGCTCCTAACTTCAACGCTGGAGCTTCTACCTGTACCGCTTGTCCTGTGAACCGC 120

Qy    433 GTTGGTGGTGCATTGAC 449
          || || || ||  ||||
Db    121 GTGGGAGGAGCTCTGAC 137
```

RESULT 12
AAA97076/c
ID AAA97076 standard; DNA; 123 BP.
XX
AC AAA97076;
XX
DT 18-DEC-2000 (first entry)
XX
DE G5 synthetic gene synthesis primer 3206.
XX
KW Immobilisation antigen; i-antigen; ichthyophthiriasis; vaccine;
KW white spot disease; freshwater fish; immune response; infection control;
KW PCR primer; ss.
XX
OS Synthetic.
XX
PN WO200046373-A1.
XX
PD 10-AUG-2000.
XX
PF 04-FEB-2000; 2000WO-US02962.
XX
PR 04-FEB-1999; 99US-0118634.
PR 02-MAR-1999; 99US-0122372.
PR 17-MAR-1999; 99US-0124905.
PR 27-APR-1999; 99US-0131121.
XX
PA (UYGE-) UNIV GEORGIA RES FOUND INC.
PA (CORR) CORNELL RES FOUND INC.
PA (CLAR/) CLARK T G.
PA (DICK/) DICKERSON H W.
PA (LINT/) LIN T.
XX
PI Clark TG, Dickerson HW, Lin T;
XX
DR WPI; 2000-506071/45.
XX
PT Novel i-antigen polypeptides and polynucleotides from Ichthyophthirius
PT multifiliis, useful for prophylaxis and treatment of Ichthyophthirius
PT infection in fish -
XX
PS Disclosure; Figure 12; 144pp; English.
XX
CC This invention relates to novel i-antigen polypeptide sequences.

CC I-antigens or immobilisation antigens ar common to a variety of
CC hymenostomatid ciliates and their expression varies in response to
CC environmental stimuli. This invention relates to i-antigens in
CC Ichthyophthirius multifiliis, a protozoan which is an obligate parasite
CC of freshwater fish causing ichthyophthiriasis or white spot disease. The
CC invention includes two polypeptide and polynucleotide sequences for two
CC i-antigens, of 48 and 55 kD. Also included in the invention are
CC antibodies capable of binding to the nucleotide sequences and a method
CC for identifying I. multifiliis serotypes using the nucleotide sequences.
CC A composition (containing the i-antigen nucleotide) capable of eliciting
CC an immune response in fish is useful for prophylaxis, treatment or for
CC controlling I. multifiliis infection in fish. Polynucleotide or protein
CC vaccines comprising a portion of the amplified product encoding an
CC antigenic i-antigen polypeptide obtained is also useful for treating or
CC preventing I. multifiliis infection in fish. Sequences AAA97036-A97042,
CC and AAA97060, AAA97065 and AAA97089 represent i-antigen genes and gene
CC fragments identified in the invention. Sequences AAA97043-A97064
CC (excluding AAA97060) and AAA97071-A97088 represent primers used in the
CC isolation of the i-antigen gene sequences. Sequences AAB25859-B25889 and
CC AAB25893-B25906 represent i-antigen protein and peptide sequences.
XX
SQ Sequence 123 BP; 25 A; 37 C; 39 G; 22 T; 0 other;

Query Match 4.8%; Score 68.2; DB 21; Length 123;
Best Local Similarity 72.7%; Pred. No. 8.5e-06;
Matches 88; Conservative 0; Mismatches 33; Indels 0; Gaps 0;

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Qy    431 GAGTTGGTGGTGCATTGACTGCTGGTAATGCCGCTACCATAGTCGCATAATGTAACGTCG 490
          | || || || ||  |||| ||||| || || |||||||| || ||  | |||||||| |
Db    122 GCGTGGGAGGAGCTCTGACCGCTGGAAACGCTGCTACCATCGTGGCTCAGTGTAACGTGG 63

Qy    491 CATGTCCTACTGGTACTGCACTTGATGATGGAGTAACTACTGATTATGTTAGATCATTCA 550
          | |||||||| || || || || || || ||||| || || || || || ||  | || ||||
Db     62 CTTGTCCTACCGGAACCGCTCTGGACGACGGAGTGACCACCGACTACGTGCGCTCTTTCA 3

Qy    551 C 551
          |
Db      2 C 2
```

RESULT 13
AAA97072/c
ID AAA97072 standard; DNA; 104 BP.
XX
AC AAA97072;
XX
DT 18-DEC-2000 (first entry)
XX
DE G5 synthetic gene synthesis primer 3202.
XX
KW Immobilisation antigen; i-antigen; ichthyophthiriasis; vaccine;
KW white spot disease; freshwater fish; immune response; infection control;
KW PCR primer; ss.
XX
OS Synthetic.
XX
PN WO200046373-A1.
XX
PD 10-AUG-2000.
XX
PF 04-FEB-2000; 2000WO-US02962.
XX
PR 04-FEB-1999; 99US-0118634.
PR 02-MAR-1999; 99US-0122372.
PR 17-MAR-1999; 99US-0124905.
PR 27-APR-1999; 99US-0131121.
XX
PA (UYGE-) UNIV GEORGIA RES FOUND INC.
PA (CORR) CORNELL RES FOUND INC.
PA (CLAR/) CLARK T G.
PA (DICK/) DICKERSON H W.
PA (LINT/) LIN T.
XX
PI Clark TG, Dickerson HW, Lin T;
XX
DR WPI; 2000-506071/45.
XX
PT Novel i-antigen polypeptides and polynucleotides from Ichthyophthirius
PT multifiliis, useful for prophylaxis and treatment of Ichthyophthirius
PT infection in fish -
XX
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CC I-antigens or immobilisation antigens ar common to a variety of
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CC environmental stimuli. This invention relates to i-antigens in
CC Ichthyophthirius multifiliis, a protozoan which is an obligate parasite
CC of freshwater fish causing ichthyophthiriasis or white spot disease. The
CC invention includes two polypeptide and polynucleotide sequences for two
CC i-antigens, of 48 and 55 kD. Also included in the invention are
CC antibodies capable of binding to the nucleotide sequences and a method
CC for identifying I. multifiliis serotypes using the nucleotide sequences.
CC A composition (containing the i-antigen nucleotide) capable of eliciting
CC an immune response in fish is useful for prophylaxis, treatment or for
CC controlling I. multifiliis infection in fish. Polynucleotide or protein
CC vaccines comprising a portion of the amplified product encoding an
CC antigenic i-antigen polypeptide obtained is also useful for treating or
CC preventing I. multifiliis infection in fish. Sequences AAA97036-A97042,
CC and AAA97060, AAA97065 and AAA97089 represent i-antigen genes and gene
CC fragments identified in the invention. Sequences AAA97043-A97064
CC (excluding AAA97060) and AAA97071-A97088 represent primers used in the
CC isolation of the i-antigen gene sequences. Sequences AAB25859-B25889 and
CC AAB25893-B25906 represent i-antigen protein and peptide sequences.
XX
SQ Sequence 104 BP; 21 A; 27 C; 30 G; 26 T; 0 other;

Query Match 4.7%; Score 66.2; DB 21; Length 104;
Best Local Similarity 77.7%; Pred. No. 2.2e-05;
Matches 80; Conservative 0; Mismatches 23; Indels 0; Gaps 0;

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Qy     85 ACTAACACAGCCGGATAAGTTGATGATCTAGGAACTCCTGCAAATTGTGTTAATTGTTAG 144
          || ||||| || ||| | || || || || ||||| ||||| || ||||| || ||| ||
Db    103 ACCAACACCGCTGGACAGGTGGACGACCTGGGAACCCCTGCTAACTGTGTGAACTGTCAG 44

Qy    145 AAAAACTTTTATTATAATAATGCTGCTGCTTTCGTTCCTGGTG 187
          || ||||| || || || || ||||||||||||||| ||||| |
Db     43 AAGAACTTCTACTACAACAACGCTGCTGCTTTCGTGCCTGGAG 1
```

RESULT 14
AAA97073
ID AAA97073 standard; DNA; 100 BP.
XX
AC AAA97073;
XX
DT 18-DEC-2000 (first entry)
XX
DE G5 synthetic gene synthesis primer 3203.
XX
KW Immobilisation antigen; i-antigen; ichthyophthiriasis; vaccine;
KW white spot disease; freshwater fish; immune response; infection control;
KW PCR primer; ss.
XX
OS Synthetic.
XX
PN WO200046373-A1.
XX
PD 10-AUG-2000.
XX
PF 04-FEB-2000; 2000WO-US02962.
XX
PR 04-FEB-1999; 99US-0118634.
PR 02-MAR-1999; 99US-0122372.
PR 17-MAR-1999; 99US-0124905.
PR 27-APR-1999; 99US-0131121.

```
XX
PA   (UYGE-) UNIV GEORGIA RES FOUND INC.
PA   (CORR ) CORNELL RES FOUND INC.
PA   (CLAR/) CLARK T G.
PA   (DICK/) DICKERSON H W.
PA   (LINT/) LIN T.
XX
PI   Clark TG,  Dickerson HW,  Lin T;
XX
DR   WPI; 2000-506071/45.
XX
PT   Novel i-antigen polypeptides and polynucleotides from Ichthyophthirius
PT   multifiliis, useful for prophylaxis and treatment of Ichthyophthirius
PT   infection in fish  -
XX
PS   Disclosure; Figure 12; 144pp; English.
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CC   This invention relates to novel i-antigen polypeptide sequences.
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CC   hymenostomatid ciliates and their expression varies in response to
CC   environmental stimuli. This invention relates to i-antigens in
CC   Ichthyophthirius multifiliis, a protozoan which is an obligate parasite
CC   of freshwater fish causing ichthyophthiriasis or white spot disease. The
CC   invention includes two polypeptide and polynucleotide sequences for two
CC   i-antigens, of 48 and 55 kD. Also included in the invention are
CC   antibodies capable of binding to the nucleotide sequences and a method
CC   for identifying I. multifiliis serotypes using the nucleotide sequences.
CC   A composition (containing the i-antigen nucleotide) capable of eliciting
CC   an immune response in fish is useful for prophylaxis, treatment or for
CC   controlling I. multifiliis infection in fish. Polynucleotide or protein
CC   vaccines comprising a portion of the amplified product encoding an
CC   antigenic i-antigen polypeptide obtained is also useful for treating or
CC   preventing I. multifiliis infection in fish. Sequences AAA97036-A97042,
CC   and AAA97060, AAA97065 and AAA97089 represent i-antigen genes and gene
CC   fragments identified in the invention. Sequences AAA97043-A97064
CC   (excluding AAA97060) and AAA97071-A97088 represent primers used in the
CC   isolation of the i-antigen gene sequences. Sequences AAB25859-B25889 and
CC   AAB25893-B25906 represent i-antigen protein and peptide sequences.
XX
SQ   Sequence 100 BP; 16 A; 35 C; 24 G; 25 T; 0 other;

  Query Match             4.5%;  Score 62.8;  DB 21;  Length 100;
  Best Local Similarity   77.6%;  Pred. No. 0.00012;
  Matches   76;  Conservative    0;  Mismatches   22;  Indels    0;  Gaps    0;

Qy    166 GCTGCTGCTTTCGTTCCTGGTGCTAGTACGTGTACACCTTGTCCATAAAAAAAAGATGCT 225
          ||||||||||||||| ||||| |||  ||| ||||| ||||||||  | || || || |||
Db      2 GCTGCTGCTTTCGTGCCTGGAGCTTCTACCTGTACCCCTTGTCCTCAGAAGAAGGACGCT 61

Qy    226 GGTGCTTAACCAAATCCACCTGCTACTGCTAATTTAGT 263
          || ||| | || || || |||||||| |||||  | ||
Db     62 GGAGCTCAGCCTAACCCTCCTGCTACCGCTAACCTGGT 99


RESULT 15
AAA97080/c
ID   AAA97080 standard; DNA; 100 BP.
XX
AC   AAA97080;
XX
DT   18-DEC-2000  (first entry)
XX
DE   G5 synthetic gene synthesis primer 3210.
XX
KW   Immobilisation antigen; i-antigen; ichthyophthiriasis; vaccine;
KW   white spot disease; freshwater fish; immune response; infection control;
KW   PCR primer; ss.
XX
OS   Synthetic.
XX
PN   WO200046373-A1.
XX
PD   10-AUG-2000.
XX
PF   04-FEB-2000; 2000WO-US02962.
XX
PR   04-FEB-1999;   99US-0118634.
PR   02-MAR-1999;   99US-0122372.
PR   17-MAR-1999;   99US-0124905.
PR   27-APR-1999;   99US-0131121.
XX
PA   (UYGE-) UNIV GEORGIA RES FOUND INC.
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PI   Clark TG,  Dickerson HW,  Lin T;
XX
DR   WPI; 2000-506071/45.
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PT   Novel i-antigen polypeptides and polynucleotides from Ichthyophthirius
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CC   of freshwater fish causing ichthyophthiriasis or white spot disease. The
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CC   controlling I. multifiliis infection in fish. Polynucleotide or protein
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CC   preventing I. multifiliis infection in fish. Sequences AAA97036-A97042,
CC   and AAA97060, AAA97065 and AAA97089 represent i-antigen genes and gene
CC   fragments identified in the invention. Sequences AAA97043-A97064
CC   (excluding AAA97060) and AAA97071-A97088 represent primers used in the
CC   isolation of the i-antigen gene sequences. Sequences AAB25859-B25889 and
CC   AAB25893-B25906 represent i-antigen protein and peptide sequences.
XX
SQ   Sequence 100 BP; 22 A; 17 C; 32 G; 29 T; 0 other;

  Query Match             4.5%;  Score 62.8;  DB 21;  Length 100;
  Best Local Similarity   77.6%;  Pred. No. 0.00012;
  Matches   76;  Conservative    0;  Mismatches   22;  Indels    0;  Gaps    0;

Qy    754 AATAATTGGGTAGCACAAAACACTGAATGTACTAATTGTGCTCCTAACTTTTACAATAAT 813
          || || ||||| || || ||||| || ||||| || ||||||||||||||| ||||| ||
Db     99 AACAACTGGGTGGCTCAGAACACCGAGTGTACCAACTGTGCTCCTAACTTCTACAACAAC 40

Qy    814 AATGCTCCTAATTTCAATCCAGGTAATAGTACATGCCT 851
          || |||||||| ||||| || || ||   ||| || ||
Db     39 AACGCTCCTAACTTCAACCCTGGAAACTCTACCTGTCT 2


Search completed: February 16, 2003, 17:00:36
Job time : 224.94 secs
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